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CHLOROFORM ANÆSTHESIA: A REPORT ON 3,000 CASES.¹

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THIS analysis of records of approximately 3,000 cases of chloroform anæsthesia is presented with two objects in view. The first is that the study may be of some value to those who are interested; the results and methods are as stated, and anyone may take it or leave it. The second is the aim to lift a burden from our backs.

The real reason for the reluctance of all young practitioners to use chloroform is their knowledge that if a death occurs the anæsthetist will be "in the can". The coroner will not spare his strictures or reprimands, and the local Press will make a Roman holiday of his reputation. The less the coroner and journalists really know about anæsthesia, the more dogmatic will be their pronouncements, on borrowed authority. While chloroform is being used, there will be, as with ether, from time to time a death on the operating table; and it occurs to me that the assumption of an inherent and inevitable danger of death from chloroform induction is best combated by the presentation of a series of cases without a fatality. When the series is large enough it should be worth quoting.

I regret that I cannot present more than a partial record of my hospital cases. Until I began the task I had no idea of the work involved, and I have been able to analyse only about 1,000 of my more recent cases, and add these to about 2,000 early cases prepared by Mr. Sears, late records clerk at the Brisbane Hospital, whose interest and

industry I acknowledge with gratitude. There are about another 1,000 cases yet to work out.

In addition to the public hospital cases there must be, extending over the past thirty-two years, at least another 3,000 or 4,000 cases in which chloroform anæsthesia was either administered by me or administered at my direction; and there has not been a death on the operating table nor a death directly due to the immediate effects of the anæsthesia. The only death on the operating table in my experience was under ether anæsthesia.

So here is a series of 3,000 cases representative of perhaps 7,000, certainly not less than 6,000, without a fatality; and the work is still going on.

Before I present the figures, it is worth while to take a brief survey of present-day opinion concerning chloroform anæsthesia. It should make the figures more interesting and direct to some extent the lines of thought.

The work of E. H. Embley (1902 to 1918) may be accepted as authoritative, so far as it goes. According to Professor Osborne (1932), very little has been added thereto—some knowledge of the effects of chloroform in causing ventricular fibrillation in the terminal stages has been acquired, but nothing else of consequence regarding the reaction to chloroform anæsthesia.

Dr. Embley, working on dogs, whose cardio-vagal relations are similar to those of man, in 1902 reported as follows:

1. Heart muscle is very sensitive to the poisonous effects of chloroform.

2. Chloroform raises the excitability of the vagus mechanism particularly in the early part of the administration. This is due to its action on the centres, and is more intense and dangerous in its effects on a heart whose spontaneous excitability is diminished by the action of chloroform on the heart muscle itself.

Chloroform vapour of 1.5% or less . . . after a period of mild excitation slowly depresses vagus excitability—above 2% . . . may occasion dangerous or persistent intermission in dogs.

¹ Read at a meeting of the Queensland Branch of the British Medical Association on October 4, 1940.

The inhibitory mechanism . . . paralysed by previous induction of chloroform anaesthesia . . . becomes almost void of vagus control . . . if he lives through the induction.

The fall of blood pressure is largely due to the direct effect of chloroform upon the heart. Heart failure begins with the fall of blood pressure . . . it precedes failure of respiration.

Section of vagi absolutely abolishes sudden heart arrests from chloroform. The heart . . . falls slowly with rapid pulse slowing as the blood pressure approaches zero.

3. The central medullary vasomotor system is stimulated . . . for a time by chloroform. The cause of the fall of blood pressure from chloroform is paralysis of muscle cells of the heart and of the arterioles . . . may be further augmented by slowing of the heart's rate.

4. The failure of respiration . . . is mainly due to the fall in the blood pressure. With a good blood pressure . . . failure of respiration is practically impossible.

There is here the possibility of establishment of a vicious circle: (a) the chances of dangerous inhibition in chloroform administration are greatly increased by imperfect respiration; and (b) respiration fails when the blood pressure falls greatly from cardiac inhibition or from other causes.

Embley made a further report on the question in *The Lancet* of August 7, 1915, which may be summarized as follows:

1. Cardio-vagal relations in dogs are similar to those of man.

2. Ventricular fibrillation was never observed, except as a terminal process when the blood pressure was very low from shock or other causes.

3. There was no temporary onset of ventricular fibrillation in dogs during induction of chloroform anaesthesia. The syncope which occurs at this stage is of vagus type only.

4. Chloroform syncope in dogs is not merely due to inhibition of the heart by vagi. The vasoconstrictor mechanism is coordinately inhibited owing to the effect of unduly high tension of chloroform in the arterial blood, which exalts the excitability of the vagus and vasodilator mechanisms, and at the same time depresses that of the myocardium.

Syncope from cardio-vagal inhibition is a result of the sudden intake of an excessive concentration of chloroform during normal respiration or of excessive respiration and intake of chloroform not too concentrated. It does not occur with a normal respiratory intake of 2% chloroform vapour or less.

Embley defines syncope as a sudden complete or partial cessation of circulation, due in the majority of instances to combined vagal inhibition of the heart and inhibition of splanchnic vasoconstriction, and in the minority of instances to splanchnic vasoconstrictor inhibition alone.

An interesting point was raised by Dr. Hornabrook, in March, 1932. He reported, from experiments on himself, that when chloroform was administered to the subject in a condition of exhaustion it might cause nodal rhythm. I have observed a similar effect on occasions, but have not investigated it.

The first comment that I wish to make is that Embley's experiments were designed to demonstrate the method or methods in which chloroform could cause death by its action on the heart or on the respiration, or both. It seems rather puerile to stress this point; and yet it is important, for the use of chloroform for anaesthesia by methods aiming at avoiding transgression of the limits of safety is a very different thing. Dr. Embley was not afraid to use chloroform anaesthesia; so Dr. Embley's report does not imply that the poisonous effects of chloroform on the heart's action cannot be kept within safe limits; indeed, he states in some considerable detail the limits of the safety margin. If a preliminary injection of atropine has been given, vagus inhibition need not be regarded as a danger in the induction stage unless the administration is grossly excessive. Further, the extreme fall of blood pressure and the attendant failure of respiration can result only from overdosage in the course of anaesthesia. That such overdosage does occur must be admitted; but it is due either to carelessness or to

ignorance of the fact that chloroform cannot be administered by methods applicable to ether. It would be better teaching of anaesthesia to give the senior student some real instruction in chloroform usage, not merely to hand on Mr. Punch's "advice to those about to—".

Secondly, Dr. Embley mentions various devices to ensure that the chloroform vapour shall not exceed a concentration of 2%. In actual practice I feel that such devices are not to be recommended. Nothing should shift the responsibility of the anaesthetist for the constant supervision of his patient. The simpler the apparatus, the less there is, other than the patient, to watch and to keep in order. This aspect of the question has a bearing on the method employed in these cases which will be detailed later.

The cases analysed by Mr. Sears are reported on as follows:

A series of 2,000 operations performed by Dr. Thelander has been investigated. They comprise the usual gynaecological conditions in addition to appendicectomy, and certain other operations usually included in general surgery. The records disclose that in only 14 of these cases was anaesthesia induced by means other than chloroform. (Even these 14 may be clerical errors of the office recording.) Of the 2,000 cases the records indicate deaths within 4 days of operation in only 4 instances (1 ether, 3 chloroform). Seventeen deaths occurred within 12 months of operation (all chloroform inductions so far as records show). There were no deaths under anaesthesia recorded among the whole of the 2,000 cases investigated. The cases were taken from records from January, 1912, and were not specially selected.

A further series is at present under investigation, which being of more recent date, will afford better facilities for exact information as to ultimate results by reason of improved methods of recording. The figures indicated above, however, have been very carefully compiled and would appear to indicate the true position regarding chloroform anaesthesia.

TABLE I.
Age Periods.

Age in Years.	Number of Cases.
15 to 19	12
20 to 24	299
25 to 29	522
30 to 34	339
35 to 39	331
40 to 44	142
45 to 49	127
50 to 54	84
55 to 59	92
60 to 65	41
56 and over	11

If Mr. Sears's classification of operations is condensed somewhat, the list reads as follows. (It will be observed that the Lady Lamington Hospital was not a gynaecological unit, but permitted all branches of abdominal surgery and operations on the mammary glands.)

Incision of abscesses, operations on glands and various procedures	109
Vaginal, cervical and perineal procedures	874
Uterine (including 8 Wertheim operations)	219
Ventral and other hernia operations	71
Kidney operations (including 14 nephrectomies)	44
Operations on Fallopian tubes (including 9 ectopic pregnancies)	61
Suspensions (uterine—various types)	320
Appendicectomies	137
Biliary operations (cholecystectomy and cholelithotomy)	30
Operations for piles (excisions and fistulae)	47
Operations on the rectum and colon (including 3 for cancer of the rectum)	11
Gastro-enterostomy	14
Operations on ovaries	105
Breast amputations <i>et cetera</i>	49
Laparotomy	18
Cystotomy and operations for caruncle	19
Total	2,128

It is regretted that this series is so barren of detail. The deaths reported are all that occurred in the hospital.

Many of these patients, however, were admitted to hospital in a hopeless condition surgically, and after some palliative treatment no doubt elected to spend their last days at home. The same applies to the later series of cases which I report in more detail. These deaths out of hospital, however, cannot be regarded as "operative mortality".

In Mr. Sears's cases I am quite certain that none of the deaths recorded were recognized as attributable to the anaesthesia. There must be some gaps in the record, for in 1912 I was using "Novocain" spinal anaesthesia in a few cases. This was, however, while I was occupying a junior position on the hospital staff, and it is likely that they may have been entered under the name of my senior at the time, the late Dr. Frank Wilson.

The later series I have taken in reverse order chronologically. They date back in a consecutive series from September, 1940, to June, 1934. They include all operations which the records office could find, and I have no reason to doubt the completeness of the series. There is still a further series dating back to the latest of Mr. Sears's collection. These I intend to analyse at my leisure, and I hope to present them with perhaps a brief analysis of the whole series later on.

The number of operations here presented totals 1,082. Anaesthesia is recorded in 1,074 cases, so that in eight cases no anaesthesia was recorded. These eight patients required minor surgical procedures, and probably had morphine or morphine and hyoscine narcosis. The age groups (Table II) are similar to those presented by Mr. Sears.

TABLE II.

Age in Years.	Number of Cases.	Age in Years.	Number of Cases.
Under 15	8	50 to 54	50
15 to 19	35	55 to 59	30
20 to 24	82	60 to 64	22
25 to 29	125	65 to 69	15
30 to 34	97	70 to 74	7
35 to 39	112	75 to 79	4
40 to 44	125	80 to 84	1
45 to 49	106	85 and over ..	1

It will be seen that no discrimination has been made in regard to age. No one is admitted to the hospital under the age of twelve years, so the effects of chloroform anaesthesia on young children cannot be illustrated. In my experience elsewhere, however, I have found that they take it very well, provided that great care is exercised in the induction. This is not always easy, for the child is apt to be apprehensive and by struggling, crying and violent breathing invites the danger indicated by Dr. Embley attending the too rapid inhalation and consequently too high arterial concentration of the drug. There is, however, little danger if the mask is removed for a few breaths as soon as the child stops struggling and crying. The ideal induction is illustrated in the case of an infant who is anaesthetized in a condition of natural sleep without awakening. This I have seen quite a number of times.

In advanced age cooperation is good as a rule, and again relatively little chloroform is required for induction and for maintenance.

Blood pressure was recorded in 364 of these cases and the results are tabulated as follows:

Systolic pressure 200 millimetres or more	24
Diastolic pressure 90 millimetres or more	98
Systolic pressure 100 millimetres or less	40
Diastolic pressure 60 millimetres or less	38
Pulse Pressure:	
Maximum	155 millimetres (250/95)
Minimum	20 millimetres (90/70)
	25 millimetres (95/70)
Highest systolic pressure	260 millimetres
Highest diastolic pressure	150 millimetres
Minimum systolic pressure	88 millimetres (88/60)
Minimum diastolic pressure	40 millimetres (95/40)

Two comments arise from this table. The first is that neither high systolic nor high pulse pressures have been

excluded from this series. In actual experience these patients take chloroform very well, as one would expect, considering that one of the immediate results of chloroform administration is to reduce the blood pressure. Many of them are patients exhibiting considerable renal impairment, including those for whom therapeutic abortion was performed. Secondly, when Dr. Embley's warning as to the danger attendant on low blood pressure and its effect on respiration is borne in mind, this table indicates that this danger has been avoided. The patients with very low blood pressure and low pulse pressure are those who have sustained serious loss or deterioration of blood. In these induction must be carefully carried out, and they take about half the amount required for robust adults.

The operation groups are not so detailed as Mr. Sears's cases. The difference between major and minor operations is, of course, arbitrary. I suppose the removal of an appendix would always be classed as a major operation, while some would class the repair of a perineum or the removal of tonsils as minor operations. I know which would be my choice. In this series there are only five unclassified operations, not gynaecological. In such cases I have, when the limits of gynaecology have been too widely transgressed, worked with the cooperation of the superintendent or of a surgeon of the department concerned.

Of the major operations, 318 were abdominal, 83 were abdomino-vaginal and 216 were vaginal, a total of 617; of the hysterectomies included, 124 were abdominal and 66 vaginal, a total of 190. There were 460 minor operations; all were vaginal and the implantation of radium is included.

This is not a surgical report, and so a very full comment on the surgical operations would be out of place. In justice, however, to the consideration of the anaesthesia, it is fair that I should state that I do not consider myself a quick operator. For example, in a large number of the abdominal operations the approach was through horizontal or muscle-splitting incisions rather than through the vertical median or paramedian incision. I frequently use the horizontal incision for total hysterectomy and nearly always for abdominal suspensions and for operations on the Fallopian tubes and ovaries, unless there is a large tumour or a considerable mass of inflammatory tissue. This is a time-consuming process; it is justified in my opinion by the shorter post-operative term in hospital and by the superiority of the resultant scar. It follows, however, that the anaesthesia has been more prolonged than it might have been by easier methods. Similarly, in vaginal hysterectomy and pelvic repair I always take my time in order to identify the various ligamentous and vascular structures and to secure a proper reconstruction. The end-results seem to justify this extra time; but undoubtedly the anaesthesia is the more protracted.

Blood counts and haemoglobin values have not been recorded, except when there were definite and somewhat urgent clinical indications. For instance, it is not desirable that such major operations as hysterectomy be performed on patients with a haemoglobin value of less than 50%, unless the indications are urgent. This is on general surgical principles, and not on account of the anaesthetic risks. There were seven hysterectomies performed on patients with haemoglobin values of 50% or under; the lowest were 37% and 42%, and one, which was probably the lowest at operation, was 48% eighteen days after the operation. The lowest haemoglobin value in this series of cases of chloroform anaesthesia was that of a patient suffering from inoperable cervical cancer, who had palliative radium therapy. The haemoglobin value was 26%. Minor operations on other anemic patients who had chloroform anaesthesia give records of haemoglobin values of 35% to 40%.

The patients who have abortions and who are admitted to hospital with severe haemorrhage and are curetted, must include many with a haemoglobin value of under 40%; but these operations are usually performed by the resident staff under ether anaesthesia. Records of the haemoglobin value are not taken in these cases, first because of their urgency, and secondly because, as is well known, the

hæmoglobin value or the blood count does not consistently indicate the extent of the hæmorrhage. The comments relative to chloroform anaesthesia in anæmic patients with low blood pressure have already been made, with a few exceptions. The case of hysterectomy recorded in which the hæmoglobin value eighteen days later was 48%, was a case of chronic nephritis associated with a high blood pressure; and several of the patients who had therapeutic abortions had low hæmoglobin values but high blood pressure.

Anæmic patients take very little chloroform for induction or for maintenance of anaesthesia. I have not observed in them any tendency to cardiac embarrassment.

If these patients are grouped according to the anaesthetic agent administered and the type of anaesthesia, they were as follows:

Chloroform	1,018
Ether	4
Ethyl chloride	2
Morphine and hyoscine	32
Spinal	5
Local	10
Nitrous oxide and oxygen	1
"Evipan sodium"	1
Paraldehyde	1
Total anaesthetic cases	1,074
Total operations	1,082

It will be observed that anaesthetic agents other than chloroform were used on 56 occasions. That most frequently used was a narcosis of morphine and hyoscine. This is such an adequate and time-saving method in minor surgery, particularly minor vaginal procedures, that it cannot be ignored. It must be admitted, however, that one is tempted to use it more frequently for patients exhibiting unfavourable clinical conditions, with the addition of local anaesthesia where it appears necessary. In vaginal work local anaesthesia is often unnecessary. The tissues concerned are not highly sensitive.

When in other regions of the body I employ local anaesthesia, I find the scale of morphine and hyoscine preparatory medication, published by Dr. Corlette, of Sydney, of the greatest value.

Local anaesthesia was definitely indicated in a number of cases for the application of radium.

The ether inductions were mostly for demonstration purposes. The rapid induction by ether, which was practised in Berlin about thirty years ago, is a very useful device, which I think every anaesthetist should know.

Spinal anaesthesia was employed in only five cases. Although two of these patients died, the deaths were not related to the anaesthesia. In one case "Evipan sodium" was used because of the patient's dread of nausea and of anaesthetics generally; in one case nitrous oxide and oxygen were used because of bad clinical condition; and in one case paraldehyde was used for a patient whose wound had to be resutured three days after the performance of a hysterectomy under chloroform. It was considered wise that she be kept quiescent for a considerable time after the repair.

In this series there were 16 deaths. Two of these deaths followed operations by other surgeons, one two days after a second operation and one fifteen days after a second operation. In the former the anaesthetic was chloroform given in my absence; it was well given and had no relationship to the subsequent death. This was a case in which the wound had burst open five days after operation during an attack of coughing. There was at the same time a sudden rise of temperature, and the patient's condition was bad. In the other case ether was the anaesthetic agent used, and the patient died of post-operative sepsis. One patient died after an operation for the establishment of a colostomy under "Novocain" anaesthesia; she had inoperable cancer of the uterus with intestinal obstruction. The colostomy acted well, but the condition steadily deteriorated and she died in five days.

Of the thirteen deaths which are definitely to my credit (or otherwise), two were subsequent to spinal anaesthesia.

Of these, one patient was in rather a bad clinical condition and died eight days after the removal of an ovarian tumour. She was febrile, and the post-mortem report was as follows: "Acute enteritis, chronic endocarditis, operation site clean, liver normal." The other patient had had a myomectomy and was apparently doing fairly well; on the twenty-second day she died suddenly from a pulmonary embolism. Her condition was febrile immediately after the operation, but normal from the third to the eighth day, when the temperature again rose slightly, and was 100.5° F. the day before death.

Of the eleven patients who died after operations under chloroform anaesthesia, one had a septic abortion with pelvic peritonitis. A colpotomy was performed, but she died the same day. She was desperately ill on her admission to hospital. Two patients died two days after operation; both had had hysterectomies. In one case the condition was obscure; a massive fibroid tumour weighing 14 pounds was present, as well as several fibroids showing degeneration and free blood and clot in the peritoneal cavity. The patient was desperately ill, and probably should not have been submitted to operation. The other operation was a straightforward hysterectomy; the post-mortem report was as follows: "Massive hæmorrhage into peritoneum, and hydronephrosis."

Three patients died six days after operation. One of these had an inoperable cancer involving the vaginal wall, and had received palliative application of radium. The progressive cachexia seemed accelerated by this procedure. The other two patients had undergone hysterectomy; one was febrile and had a large hematoma in the pelvis; the other was reported *post mortem* as having had suppurative peritonitis.

One patient died eight days after operation for a vaginal hysterectomy; she had post-operative pelvic peritonitis. She had fever and purging, there was no jaundice, no bile in the urine and she was febrile before operation.

One patient died seventeen days after a hysterectomy, and the post-mortem report was "suppurative peritonitis and empyema". She became febrile two days after operation, and the first indication was that of peritonitis. I am satisfied that the source of infection was not pulmonary.

One patient died eighteen days after operation. She had an inoperable cancer of the cervix and vagina, and deterioration in her general condition went on after a palliative application of radium.

One patient died fifty days after a laparotomy for pyosalpinx. She developed a spreading ulcer of the abdominal wall, which we could not control. It reached the largest size I have ever seen, and she died of cachexia.

One patient died sixty days after operation. The operation was merely an exploration, which revealed a large malignant ovarian tumour with extensive metastases.

To sum up, examination of my own series of cases reveals eleven deaths subsequent to operations under chloroform anaesthesia; and in none of them does the anaesthetic appear to be in any way related to the issue. In any case, a mortality rate of thirteen among 617 major operations and 460 minor operations does not seem to discredit the anaesthesia.

In one of these cases the anaesthesia was induced by a resident medical officer of considerable experience, and I was negligent in my supervision. As soon as the patient was brought into the operating theatre, however, I observed that he seemed to be using "ether technique", and asked him to lift up the mask. The patient looked very ill, and my ear on the chest could detect no heart sounds. I rapidly opened the abdomen and, introducing my hand, gave the heart a touch or two under the diaphragm. It recommenced beating immediately and I proceeded normally with the operation. This patient was grossly overdosed, for she required very little further anaesthetic during the operation (oophorectomy, Gilliam suspension and appendicectomy). I think the heart would have resumed action in any case; but in such a contingency prompt action is necessary. This patient had had $\frac{1}{100}$ grain of atropine before operation and showed no ill effects afterwards.

This case seems to indicate that absent-mindedness in the induction of anaesthesia must not be tolerated. The respiration was somewhat noisy as she was brought into

the operating theatre, and it is a standing instruction in chloroform anaesthesia to take no risks with noisy or violent breathing. In such conditions there may be two factors at work. On the one hand the respiration may be noisy because it is unduly forcible; and Dr. Embley's researches indicate how this brings a danger of excessive concentration of chloroform in the arterial blood. On the other hand, the noisiness may be due to impediment in the respiratory tract. This brings about the double danger of deficient oxygenation and of cardio-dilatation by forcible inspiration through an obstructed airway.

Time does not permit an analysis of the cardiac lesions exhibited in this series. There were not many, and in all cases there was adequate compensation. There were a few cases of mitral stenosis with some cardiac irregularity, and a few other valvular lesions. In a number of cases there was considerable acceleration of the heart's rate—this, of course, being calculated apart from the excitement prior to operation. There was no recorded case of bradycardia, about which I should be more concerned than about tachycardia or irregularity.

The most spectacular case was that of a congenital "blue girl" aged thirty-three years, with blue face and hands, clubbed fingers and some swelling of the feet. She had a patent *ductus arteriosus* according to my friend Dr. Shell; but her condition was not so grave as would appear from this description. Her pulse rate varied between 70 and 80 per minute, and she was getting about quite well.

In the Brisbane Hospital the rule regarding chloroform anaesthesia is that it is not to be used except at the direction of the surgeon concerned, and therefore largely on his responsibility.

In this series the anaesthetist has been, in the majority of cases, a junior resident medical officer, who was at the outset quite inexperienced in chloroform anaesthesia. It has therefore been my task to instruct him in the methods to be used and to keep a watch on the patient's condition throughout. After the first five to ten cases he manages the induction very well as a rule, but I am so situated regarding the responsibility that I cannot afford wholly to trust anyone. Many of my junior colleagues will doubtless remember how the progress of the anaesthesia has been supervised from the perineum—and there is nothing miraculous about it. As soon as my junior anaesthetist has become proficient enough to acquire some self-confidence, he is usually moved on and another tiro takes his place. The change would be made—appropriately enough—monthly, or according to the moves of the resident staff, bi-monthly.

The equipment is simple. It consists of a bottle of chloroform and a bottle of ether, a gag, tongue forceps, pharyngeal airway and sponge forceps. There is a Schimmelbusch mask, set in a heavy linen or huckaback hand towel, and, of course, a hypodermic syringe and various analeptics, of which I know (and intend to know) very little. The dropper should have been mentioned; the best is a cork with a single tube through it. It is essential that the dropper should not be able to deliver a continuous drip of chloroform. Unfortunately nothing so simple as this is available at the Brisbane Hospital, so we have to use the more dangerous two-way drip stopper.

Of these articles, very rarely are any used but the chloroform bottle and dropper, the mask and the towel. Occasionally during the course of the anaesthesia, when I see that my anaesthetist is worried by the breathing, I instruct him to pour some ether over the mask—never during induction. The airway has not been used more than four or five times in the whole series of cases.

After the routine examination of the patient, the pulse rate and the pupils being particularly noted, the anaesthetist applies the towel, neatly folded, under the patient's chin and along each side of the face up to the temples. The mask is held by the left thumb and forefinger almost vertically off the patient's face. This makes a sort of well, wide open above. The patient can see it is wide open, and is reassured that she will not be smothered.

The patient is now requested to count after the anaesthetist, slowly, repeating the numbers as he calls them. This fixes the attention and greatly restricts the tendency to hysterical talk. If the patient is not willing, it is explained that this is to prevent her from saying or telling things she would not like to say. (Most of us know of some such things.) The fingers of the anaesthetist's left hand extend across the folded towel, the forefinger resting on the mask frame, the middle finger-tip just below the jaw, and the ring or fifth finger crossing the angle of the jaw reaches with its tip the carotid pulse at the bifurcation. This position is easily maintained if the thenar eminence is resting just beside the orbit. All these details are important, because it is vitally necessary to feel the pulse continuously and to be able to control the mask and the jaw at the same time.

Chloroform is poured on at the rate of about 15 or 20 drops at a time, to make a wet patch as big as a crown-piece on the average. The bottle is held away from the mask till this has almost completely evaporated, then the process is repeated.

Presently the counting is slowed a little, till it is at the rate of one number for each breath. This helps to induce the patient to breathe through the mouth, which greatly reduces the tendency to nausea. As the count proceeds the mask is gradually lowered, and usually at about "40" the other hand quietly takes the towel folds and crosses them over the forehead. The mask is now nearly closed, and by about "60" the mask is quite closed, with the anaesthetist's thumb resting on the frame; the forefinger now moves under the chin, assisting the middle finger in the control of the jaw. About this time the patient has "taken the count".

From now on the pulse must never be forgotten. Its rate is usually much accelerated at the beginning, but has slowed considerably by the time the count has reached "40" or "50".

Swallowing movements and some incoördinate struggling may now occur; they are an indication to increase slightly the supply of chloroform. The airway must be kept clear; there is always a position of the jaw which permits this. A full-sized ordinary pillow is preferable at the outset, but from this point a low pillow is better. As soon as struggling has ceased it is well to lift up the mask and look at the pupil, observing at the same time the carotid pulse. The cornea need never be touched.

Ideal surgical anaesthesia accompanies a steady pulse and a moderately dilated pupil, which reacts rather sluggishly but definitely to light. The warning signs are, first and at all times, those relative to the circulation. Undue slowing or intermission of the pulse, or any indication whatever of failing circulation, indicates that the anaesthesia is deeper than need be. These signs must be observed before they are advanced enough to be real danger signs. There is an ample margin, but not, of course, so wide as in ether anaesthesia.

During anaesthesia the state of the pupil is also a valuable sign. If it is unduly dilated and unduly sluggish in its reaction to light, the mask must be held open until the significance of the condition is clear. As one of my resident medical officers put it: "The dilated pupil shows that the patient wants to vomit or to die." In such a case it is obviously wiser to risk the reprimand of the surgeon than the censure of the coroner.

On no account must a continuous drip administration of chloroform be attempted. Pour on more or less according to the effect on the patient. The rate of absorption is dependent on so many factors that it is unpredictable; but the condition of the circulation can always be observed. If there is a foolproof method of delivering a 2% vapour, it does not interest me—anaesthesia is no task for fools.

Deterioration of the circulation shows very clearly in the wound and should be mentioned by the surgeon whenever it is observed.

Careful measurements have been made of the quantities of chloroform used in this technique; adult women of normal build, with no premedication but atropine, require fairly accurately two drachms for induction, and for main-

tenance of anaesthesia (including induction) one ounce for the first hour, thereafter less.

The question of the need or usefulness of chloroform anaesthesia is not discussed in this paper. Needless to say, I find it useful. The current doctrine regarding chloroform anaesthesia could perhaps be summed up in the public notices we see: "Danger, keep off." Yet here are 3,000 consecutive cases, representing at least as many more in private practice, in which chloroform was administered under the conditions described without a fatality.

The conclusion is that with apparatus no more elaborate than that described, the induction of chloroform anaesthesia has an adequate safety margin to permit its use by anyone who will take the trouble to learn the methods and will keep his mind on the job.

MENORRHAGIA AND METRORRHAGIA.¹

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IN spite of the newer terms, such as epimenorrhœa and hypermenorrhœa, the terms menorrhagia and metrorrhagia appear to suffice in indicating unusual blood losses during the menstrual life of women.²

Menorrhagia is the term which is applied to the menstrual loss which occurs at the usual time, but which is increased either in amount or in length of flow, or in a combination of these two.

Metrorrhagia is the term applied to uterine blood loss—either much or little—which occurs at any time, and which may have no relationship to the time of the normal menstruation.

Menorrhagia.

Menorrhagia may be divided into five groups: (i) Menorrhagia due to local causes, (ii) excessive loss due to endocrine irregularity, (iii) increased loss resulting from infections, (iv) menorrhagia due to unusual circulatory disturbances, and (v) loss associated with an abnormal nervous system.

These causes are dealt with more fully as follows.

The local causes include uterine congestion associated with subinvolution, chronic metritis (*fibrosis uteri*), parametritis, neoplasms (benign and malignant), including fibroids, fibroid polypi, ovarian tumours, ovarian cystomata and endometriomata.

Endocrine causes, such as *metropathia hæmorrhagica*, derive their origin from derangement of the pituitary ovarian mechanism. There appear to be a greater secretion of prolactin A and the production of a greater amount of folliculin, which in turn lead to endometrial hyperæmia and œdema with necrosis of the superficial layers of the endometrium. There is also a reduced secretion of prolactin B, and this results in a failure of luteal secretion and so an absence of the secretory stage of the endometrium.

The hyperæmic endometrium becomes very engorged and, with necrosis of the superficial cells, blood loss takes place. This condition may be associated with either menorrhagia or metrorrhagia and it is finally diagnosed by microscopic examination of the scrapings after curettage.

Infectious causes may be puerperal in origin or they may follow abortion. They may also be related to gonococcal or other infections of the pelvis. These may produce menorrhagia owing to the uterine congestion resulting from these causes or from adnexal inflammatory changes.

Circulatory factors include deficient coagulability of the blood (for example, a blood calcium content below nine milligrammes per hundred cubic centimetres), or there

may be a reduction of thrombokinase when there are fewer blood platelets than usual. Other factors which are apt to produce these results are scorbutus, purpura, hypertension and achlorhydric and hypochromic anæmia.

Amongst the nervous causes of menorrhagia are (a) excessive coitus, (b) masturbation, (c) shock.

Metrorrhagia.

The pathological factors in metrorrhagia are not usually connected with the physiology of the ovarian and the menstrual cycle. They may be classified as follows: (i) abortion, (ii) ectopic gestation, (iii) erosion of the cervix, (iv) neoplasms, benign or malignant, (v) endocrine imbalance, (vi) (a) granulosa cell tumour of the ovary, (b) pseudomucinous cystadenoma, (c) papilliferous cystadenocarcinoma, (d) teratoma.

Abortion (which is usually preceded by a period of amenorrhœa) causes uterine blood loss which may be slight or free, but is usually continuous.

Ectopic gestation, which may follow amenorrhœa of a few weeks, is usually accompanied by some loss of blood which is "prune juice" in colour, and is rarely excessive. When the ectopic gestation ruptures all the signs of an abdominal catastrophe appear. I have seen ectopic gestation and uterine disorders in the same woman at the same time. The proof of the latter was by curettage, and of the former by abdominal section and the discovery of the rupture and the blood.

Erosion of the cervix may develop by stimulation of the columnar epithelium (which covers the area denuded of the squamous epithelium). This glandular epithelium becomes so engorged that it may bleed spontaneously or after mechanical irritation as by coitus. Incidentally, coitus may stimulate the anterior pituitary body, and so an increased secretion of prolactin A provokes follicular secretion, and this in turn produces pelvic congestion and a greater tendency for the erosion to bleed. This stimulation by coitus was originally shown in the doe, in which, after copulation, owing to stimulation of the anterior pituitary body and the subsequent secretion of prolactin A, ovulation resulted.

Neoplasms frequently cause metrorrhagia, and the most common is the simple mucous polypus. Fibroids also, although more usually associated with menorrhagia, may—especially when pedunculated and ulcerated—cause metrorrhagia. Finally, carcinoma of the cervix or corpus, and more rarely hydatidiform mole and chorionepithelioma of the uterus, will cause metrorrhagia.

Endocrine disorders in some instance cause excessive follicular secretion, and the endometrium becomes engorged and finally necrosed; this results in blood loss which may not coincide with normal menstruation. Rarely a slight loss accompanied by pelvic pain, about fourteen days before the time when menstruation should occur, will be caused by uterine contractions, which take place when the follicle attempts to rupture through a sclerosed *tunica albuginea*. The more common type, however, is that which arises from numerous follicular cysts each containing œstrin or folliculin. This œstrin provokes congestion of the endometrium and at the same time it prevents the formation of the *corpus luteum*. The endometrium ultimately becomes necrosed and blood loss takes place. These cases have been cited by Shaw, Graves and Schroeder.

Granulosa-cell tumour of the ovary comprises spheres of granulosa cells, and these are usually filled with *liquor folliculi*; but they contain no ovum. Masses of these bodies coalesce and produce the granulosa-cell tumour. The cells are the same as those which surround the normal Graafian follicle; but the latter contains the *discus proligerus* and the ripening ovum. These tumours secrete folliculin and when they occur in children they cause sexual precocity. In adults they first cause amenorrhœa and then menorrhagia; in women past the menopause, however, they cause endometrial hyperplasia and subsequently uterine hemorrhage plus a renewal of libido. In this group there are also pseudomucinous cystadenomata, papillary cystadenocarcinoma and teratomata. These cause bleeding by endocrine, congestive or causes associated with extension of the condition.

¹ Read at a meeting of the South Australian Branch of the British Medical Association on August 29, 1940.

² Before proceeding further Dr. Matters showed a number of slides depicting the main features of the uterine circulation.

Treatment of Menorrhagia.

The first local cause of menorrhagia is uterine congestion due to retrodisplacement or lack of support in the vaginal vault. The former is treated by shortening of the round ligaments, and sometimes it is also necessary to plicate the utero-sacral ligaments.

Fibrosis uteri following subinvolution may be treated by a submenopausal dose of radium. Of the last forty cases in which this treatment was used, only two were failures. Probably in these two cases much larger doses of radium were required, but subtotal hysterectomy was decided upon. Both of these cases were associated with fibroids, which make it more difficult to estimate the radium dosage. This type of treatment is apt to produce an increased loss for the first month or so owing to stimulation of the ovaries. Further, a disagreeable discharge may occur for a few weeks. This worries the patient, but it is only necrotic debris. The alternative to irradiation is subtotal hysterectomy, or sometimes even total hysterectomy may be necessary when the cervix is badly lacerated and eroded.

Parametritis is treated by rest, heat and the administration of sulphamidamide.

The treatment of neoplasms, both benign and malignant, will be dealt with under the heading of metrorrhagia.

In regard to chocolate cysts, excessive ovarian activity and pelvic congestion from endometriomata may cause excessive menstrual loss, but an additional factor may be present, such as fibroids. This statement is made because I have in some sixteen cases found fibroids associated with endometriomata. These patients should be treated by removal of the chocolate cysts and, if there are adhesions, removal of the ovary also. Adhesions are usually dense in these cases and sometimes formidable. Removal of secondary nodules in the recto-vaginal septum is an increased risk which is seldom warranted. It is better to use deep X-ray therapy, which stops the menstrual cycle and so the further development of the endometriomata. Radium will produce the same result.

Endocrine causes may be hypersecretion of the prolan A fraction of the anterior pituitary body or excessive secretion of the ovarian follicles associated with relative failure of secretion of prolan B and the non-luteinization of the *stratum granulosum*. In some cases in which hypothyroidism is demonstrated by a reduced basal metabolic rate, treatment by thyroid extract may be successful. Women with excessive follicular secretion (demonstrable by the Aschheim-Zondek or Friedmann tests) may be treated temporarily by the injection of five or ten milligrammes of "Progestin" or by stimulation of the luteal cells by the injection of "Antuitrin S" or even by stimulation of the anterior-pituitary body by X rays. Zuckermann (1937) and Papanicolaou (1939) (this latter an indefatigable endocrine investigator) have shown that testosterone propionate, when injected into women with menorrhagia, has produced atrophy of the endometrial cells as well as of the vaginal epithelial cells (the reverse from folliculin injections), and the result has been a reduction of the excessive loss of blood. The injections are of five to ten milligrammes at first, but are reduced later. Inunction of testosterone in oil is also effective.

Infective causes may be puerperal or gonococcal in origin. The dense adhesions cause pelvic congestion, with its resulting pain and upset of the ovarian hormones. The condition may be relieved by short-wave therapy and hot vaginal douches. Frequently it is necessary (after trying various forms of treatment) to remove the uterus. Radium in these cases may cause recrudescence of the old infection.

Menorrhagia, whether due to anaemia, defective blood coagulability, scorbutus or purpura, is treated by treatment of the disease causing the loss; for example, iron and liver are given for anaemia, calcium is given for reduced coagulability of the blood, ascorbutic acid or vitamin C for scurvy. When hypertension is the cause it must be treated by one of the various means which will produce the best results.

Menorrhagia due to nervous causes, such as excessive coitus and masturbation, is treated by the suppression of

the cause with "Luminal" or similar drugs. Later the patients should be given a healthy open-air life with exercise.

The Treatment of Metrorrhagia.

Metrorrhagia due to abortion is treated by curettage if the abortion is inevitable or incomplete.

Metrorrhagia due to ectopic gestation is treated by abdominal section as soon as the diagnosis is made. If there is doubt of leaking or ruptured ectopic gestation, an aspirating needle is inserted into the pouch of Douglas, and this will clinch the diagnosis if an ectopic gestation is present.

Erosion of the cervix is now treated by linear cauterization or coagulation by diathermy.

Neoplasms causing metrorrhagia may be (a) mucous polyp, (b) submucous fibroids, (c) chorionepithelioma, (d) carcinoma, either squamous cell or adenocarcinoma.

Mucous polyp is treated by simple torsion and removal, plus curettage of the uterus in order to be certain that no other cause is operating; the polypus may also be coagulated by diathermy.

The usual treatment of submucous fibroids is by subtotal hysterectomy, but in some cases by myomectomy, especially when the patient desires to have children. Several such patients in my series, who have been treated by myomectomy, have later become pregnant and have borne one or more children. In some cases the uterus treats the fibroid as a foreign body and tries to expel it, so that the fibroid becomes pedunculated. In cases in which fibroid polyp become large and protrude through the cervix like a fetal head, the protruding part is frequently ulcerated and the ulcerated area gives rise to irregular blood loss. The continual loss may deplete the haemoglobin supply, and so these patients may require a blood transfusion; the fibroid is then divided piece by piece with the endothermy knife attached to the active electrode of a diathermy apparatus. If bleeding points occur, they are controlled by artery slips and then coagulated by switching on the coagulating current and using the artery clip as the active electrode. Torsion or *morcellement* may suffice.

Chorionepithelioma is usually associated with a history of recent abortion, hydatidiform mole or parturition. A positive result with the Aschheim-Zondek test is enough to produce a conclusive diagnosis. This may be confirmed by curettage and by the discovery of invading syncytium and Langhans' cells. These patients must be treated by total hysterectomy. If no metastasis has occurred the results are quite satisfactory.

When metrorrhagia is due to carcinoma, as a rule the cancer is cervical and of a squamous epitheliomatous type. More rarely, especially when the endocervix or fundus is the site, the carcinoma is an adenocarcinoma. The squamous-celled carcinoma of the cervix is friable and bleeds easily. If it involves the cervix only it is regarded as operable, and the Wertheim operation for panhysterectomy (with which operation Victor Bonney has had so much success) is one of the methods of treatment. As, however, there are very few Bonneys, and as the average mortality and morbidity rates would be much higher than Bonney's, only the early cases in which no dissemination has occurred are called operable. Even in these cases the morbidity and mortality rates are very high and, as is indicated, the cases suitable for operation are relatively few.

The method of treatment which has found most general application is that of irradiation. Even the figures given by Bonney are not better than those given for radium treatment; but as in the greater number of cases the lesions are inoperable, they may still be treated by radium. Thus the field is seen to be much greater than that for operation. The condition of some of these unfortunate people has been regarded as hopeless; but treatment by radium, given by George Gray Ward, of New York, purely for relief of symptoms, has given an actual cure rate of 2% of what Gray Ward calls "salvage cases".

The various men with whom I worked in 1935 included Professor Regaud of the Institut du Radium in Paris,

Heyman of Stockholm, Donaldson of London, Heley and Gray Ward of New York, and Max Cutler of Chicago. These men used the Regaud technique or a modification of it. This technique involves the insertion of radium enclosed in filter capsules of a suitable metal, and the capsules are placed one behind another in the uterine body and in the cervical canal. The emanations which filter through these capsules, which are really filter screens, are the γ rays, or what were called the hard rays. In each lateral fornix is a cork, in the centre of which is a filter capsule enclosing radium. These two corks are connected by a watch spring, which holds them firmly in the fornices, and from these colpostat corks there is a cross-fire of emanations with those from the cervical capsules through the malignant cervical tissue. This method is that of Regaud. Max Cutler modifies it by adding a third cork in the bow of the watch spring and held over the cervix. Heyman follows a further modification by packing silver boxes containing the radium in the fornices instead of using the corks and the spring. Heyman uses larger amounts of radium over shorter periods than Regaud. Malcolm Donaldson uses a modification of Heyman's "boxes", with the boxes held as an adjustable butterfly wing around the cervix.

In a few weeks at the Memorial Hospital, New York, it was possible to see an extremely large number of patients investigated and treated. William Healey is in charge of the treatment of uterine carcinoma, and James Ewing is a very wise pathologist who directs the hospital. In this hospital, with its tremendous number of patients, radium irradiation and Coutard's X-ray treatment have given the best results.

Professor Lynch, of the University of California, and H. H. Schlink, of Sydney, give irradiation first, and if the condition is regarded as being operable, they perform Wertheim's hysterectomy a few weeks later.

Carcinoma of the uterine body is usually adenocarcinoma—that is, it is composed of columnar epithelium which is more radio-resistant than the squamous-cell carcinoma of the cervix, which is radio-sensitive. Ewing has shown that in accordance with a certain cell type of classification, the more undifferentiated and embryonic the cells become, the more radio-sensitive they are, and therefore the more suitable for irradiation treatment. On the other hand, the more highly differentiated the cells are (for example, adenocarcinoma), the more radio-resistant they are, and therefore the less suitable for irradiation treatment.

It follows then that carcinoma of the fundus is better treated by surgical measures, although Heyman has treated many patients by packing in a number of cartridges containing radium. Usually it is better to perform a panhysterectomy, which may subsequently be followed by deep X-ray therapy. This latter may be unnecessary if comparative figures are of value in the assessment of these cases.

The endocrine disorders causing metrorrhagia are similar to those which cause menorrhagia, but they are irregular. The metrorrhagia resulting from numbers of follicles containing retention cysts in the ovaries is treated by injections of large amounts of prolan B, so as to stimulate the activity of luteal cells. The endometrial cells may also be atrophied by means of the testoviron propionate mentioned earlier. In cases associated with sterility it is necessary to resect wedges of the ovarian tunica albuginea, at the same time removing retention cysts. By removal of the wedges and transverse suture the follicles are enabled to rupture when the ovum is mature.

Granulosa-cell tumours, pseudomucinous cystadenomata, papilliferous cystadenocarcinomata and teratomata should be treated by extirpation, and the malignant varieties should be treated post-operatively by deep X-ray therapy. It must be borne in mind also that many of the malignant ovarian tumours or cystomata are bilateral. When there is no clinical evidence of pathological changes in an ovary and when the patient has not reached the menopause, the ovary should not be sacrificed, as was so often the method adopted in the past.

Acknowledgement.

I should like to thank the librarian of the Royal Australasian College of Surgeons for his help in obtaining references and articles which have been used in the preparation of this paper.

AIR RAID EXPERIENCES IN THE EAST END OF LONDON.

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DURING the first month of the German bombing of London I had an admirable opportunity of observing and treating air raid casualties whilst I was surgeon in the Emergency Medical Service in a hospital in the East End.

The number and type of casualties vary according to the type and magnitude of the bombs employed and the buildings onto which they fall. The bombs used in these raids may be roughly divided into two main classes: (a) high explosive (including the time bomb), varying from 50 to 1,500 pounds in weight, and even land mines, and (b) incendiary, varying from the single small bomb to the oil bomb, which, on exploding, scatters burning liquid in all directions. These bombs were all released at a high altitude, and consequently their effect was increased in intensity.

The effects of an exploding bomb on the human body may be divided into two main categories: (a) those due directly to the bombs, and (b) those due indirectly to the bombs.

Direct effects:

- (i) Shrapnel wounds from the burst bomb casing.
- (ii) Direct effects of the blast or suction wave:
 - (a) Bomb bursting in close proximity, leading to dismemberment or death.
 - (b) Bomb bursting further away, causing injury by hurling the patient to the ground or against some solid object.
 - (c) Lung blast.
- (iii) Injuries due to the effect of the bomb explosion on buildings:
 - (a) Crushing injuries of varying grades of severity.
 - (b) Injuries due to flying missiles, ranging from blocks of masonry to bricks, stones or glass.
- (iv) Burns:
 - (a) From incendiary or oil bombs.
 - (b) From burning buildings and other objects.

Indirect effects:

- (i) "Siren injuries".
- (ii) Blackout injuries.
- (iii) Drowning, as for instance in flooded cellars.
- (iv) Carbon monoxide poisoning from burst gas mains.
- (v) Shrapnel wounds from the anti-aircraft barrage.
- (vi) Exhaustion from prolonged exposure.
- (vii) Psychological effects—for instance, the formation of neuroses or the aggravation of psychoses.

With regard to the term "siren injuries", there were many cases of fractures of limbs, especially of the leg and forearm; these were sustained when the patient was running to shelter on hearing the "alert" warning sirens. These occurred long before air raids on London actually commenced. They were mostly due to slipping down steps or inclines leading to shelter entrances.

The "blackout" also was responsible for many road accidents, with consequent mortality and morbidity. During an air raid all vehicles were driven without lights, and road fatalities were very common.

In the first few days of the raids many persons suffered from a syndrome called "air raid stomach", characterized by gnawing epigastric discomfort and anorexia. This usually lasted two days, and was probably due to the novelty of the raids. As people became accustomed to the bombing it cured itself spontaneously.

There now follows a list of actual air raid casualties admitted to the hospital to which I was attached during the first month of the so-called "aerial Blitzkrieg".

There were 128 persons admitted to hospital in this time, and they are classified according to the main injuries received in order of frequency of occurrence.

Air Raid Admissions.		Number.
Injuries		
Surgical shock only	.. . . .	35
Generalized superficial bruises and abrasions—		
(a) Mild	.. . . .	17
(b) Severe	.. . . .	10
Injuries to bones and joints—		
Simple fractures—		
Tibia and fibula	.. . . .	5
Ribs	.. . . .	3
Clavicle	.. . . .	2
Metatarsus	.. . . .	1
Compound fractures—		
Tibia and fibula	.. . . .	3
Femur	.. . . .	1
Metacarpus	.. . . .	1
Sacrum	.. . . .	1
Perforating joint wounds—		
Knee	.. . . .	2
Ankle	.. . . .	1
Shoulder	.. . . .	1
Wrist	.. . . .	1
Elbow	.. . . .	1
Head injuries—		
Lacerated scalp	.. . . .	10
Concussion	.. . . .	2
Cerebral contusion	.. . . .	2
Nerve deafness	.. . . .	1
Lung injuries—		
Lung blast	.. . . .	2
Crushing injury of chest	.. . . .	1
Penetrating wound of chest	.. . . .	1
Abdominal injuries—		
Evisceration	.. . . .	1
Cortical bruising of kidneys	.. . . .	2
Facio-maxillary injuries—		
Fractured nose	.. . . .	2
Severely lacerated face	.. . . .	1
Peripheral nerve injuries—		
Facial	.. . . .	1
Radial	.. . . .	1
Severed tendons—		
Wrist	.. . . .	1
Miscellaneous injuries—		
Shrapnel wounds	.. . . .	6
Glass lacerations	.. . . .	2
Perforated gastric ulcer	.. . . .	2
Severe burns	.. . . .	1
Attempted suicide	.. . . .	2
Anxiety neurosis	.. . . .	1
Severe exhaustion	.. . . .	1
		15
		128

Naturally, one cannot draw any general conclusions from these figures, which represent only a small group of patients from a small area of the East End. That may be done only when the figures from the whole of London and England are analysed. Nevertheless one is able to see the type of injuries with which the surgeon dealing with air raid casualties has to cope.

In addition, many minor cases of superficial abrasions and simple fractures were dealt with in the out-patient department; but these were a relatively small number, because this type of patient usually suffered from severe shock and required admission to hospital.

Description of Injuries.

All patients, when first seen, were thickly coated with dust from shattered bricks and plaster. It filled the mouth, the nostrils, the ears and even the eyes, and was so firmly adherent as to require days for complete cleansing.

Practically without exception the casualties were admitted in a condition analogous to severe primary surgical shock. In 35 of the 128 cases this was the only injury received. This group responded rapidly to treatment with morphine and warmth, and in most instances they were able to be discharged in twenty-four hours. Only two patients of the whole series required intravenous medication with plasma, and in these instances the shock was accompanied by other severe injuries.

Twenty-seven patients received mainly superficial injuries—for example, bruises and abrasions, often of an extensive nature. Many of these were complicated by the

presence of foreign bodies of all descriptions—for example, stones, gravel and even chicken feathers from feather pillows.

Twenty-four cases were orthopaedic in nature, involving the locomotor system, the most serious being compound fractures and perforating joint wounds. All these were due to crushing by pieces of masonry, concrete or stones; there was in addition extensive involvement of the surrounding soft parts, with much destruction of muscle and skin. There were no limb injuries due to metal flakes from the small shrapnel bomb common in the Spanish civil war. The perforating joint injuries were usually due to such missiles as stones or pieces of brick or wood, hurled with great force, often causing through-and-through wounds. These wounds were gross in character, and the points of entrance and exit were often well away from the joint itself. The joint involvement in many cases could be determined only by careful exploration at operation.

Chest Injuries.

As regards chest injuries, a strikingly small proportion of patients was admitted to hospital with this type of lesion. This remark applies also to abdominal, head (excluding scalp) and facio-maxillary injuries, and is in agreement with the conclusions drawn by most writers on air raid casualties. This is because persons suffering these injuries are usually found dead or dying.

The small group of chest injuries raises many interesting points. First, there was only one case of a penetrating wound of the chest.

This patient was standing erect when a bomb exploded close by, hurling debris in all directions. He was struck by a stone in the third intercostal space two inches from the sternum. This ruptured the internal mammary artery and entered the pleural cavity. Simultaneously the force of the explosion hurled him on his back, fracturing the seventh and eighth ribs at their angles. The fractured ends lacerated the posterior surface of the lower lobe of the lung, causing severe hemorrhage, leading to a large hemothorax and necessitating thoracotomy.

There was one crushing injury of the chest:

A man, aged sixty-five years, was removed from a wrecked house and admitted to hospital in a badly shocked condition. Examination disclosed that he had a large area of surgical emphysema over the right subscapular region. The eighth, ninth and tenth ribs of the right side, and the ninth and tenth ribs of the left side were fractured at their angles. These injuries masked the state of the underlying lungs at that time. A later radiological examination disclosed an extensive mottling of both lungs, a picture not unlike that seen in some cases of lung blast, and due to the extravasation of blood into the lung tissues. There was no fluid in the pleural cavities. Death occurred three days after the patient's admission to hospital, and a post-mortem examination disclosed extensive bruising and laceration of both lungs. These lesions were undoubtedly due to crushing from the debris of the wrecked house.

There were two cases of lung blast, and in view of the present interest in this condition, their histories are given in detail. The patients were a husband and wife, who were sheltering in the cellar of a two-storied brick house when it was struck by a bomb. The house collapsed into the cellar, burying them in the wreckage. They were dug out of the cellar and brought to hospital two hours after the "incident".

CASE I.—The husband, aged forty-seven years, was admitted to hospital on August 31. Examination disclosed that he was pale and shocked. There was a large lacerated wound of the left loin with involvement of the external oblique muscle. There was no injury to the chest wall, and the lungs were clinically normal.

He quickly recovered from his shock, which was treated by warmth and the administration of morphine. One and a half hours after his admission to hospital a nitrous oxide and oxygen anaesthetic was administered, débridement was performed and the wound was packed with "Vaseline" gauze.

On the following day, September 1, he had a dry cough and his temperature rose to 103° F. (see Figure 1, Case I). Examination of the lungs disclosed some fine crepitations at the base of the right lung posteriorly. The percussion note was resonant and the breath sounds were vesicular. His general condition was good and he had no pain in the

chest. On September 2 his clinical condition was the same. A radiograph disclosed congestion of the bases of both lungs, with a patch of consolidation at the right base. There were no fractured ribs and there was no fluid or air in the pleural cavities. A blood count revealed a leucocytosis of 19,600 white blood corpuscles per cubic millimetre; 85% were neutrophile cells, 12% small lymphocytes, and the remainder large lymphocytes.

On the next day, September 3, there was a patch of tubular breath sounds with coarse crepitations at the base of the right lung. Percussion revealed dullness over this area. His general condition was good and his temperature was 99° F.

On September 5 examination revealed that the breath sounds at the base of the right lung were now vesicular in character. Numerous coarse crepitations were still present. The percussion note was resonant. Clinical examination on September 7 revealed no abnormal physical findings in the chest. Radiography confirmed this and showed that the patch of dullness had disappeared.

During his illness his general condition gave no cause for worry at all. He had a non-productive cough from the first day and produced some yellow sputum on the fifth day. He never had chest pain or hæmoptysis during his illness. His wound healed well.

Sulphapyridine was administered from the first day of illness.

I could not observe this man further, as he was transferred to a base hospital.

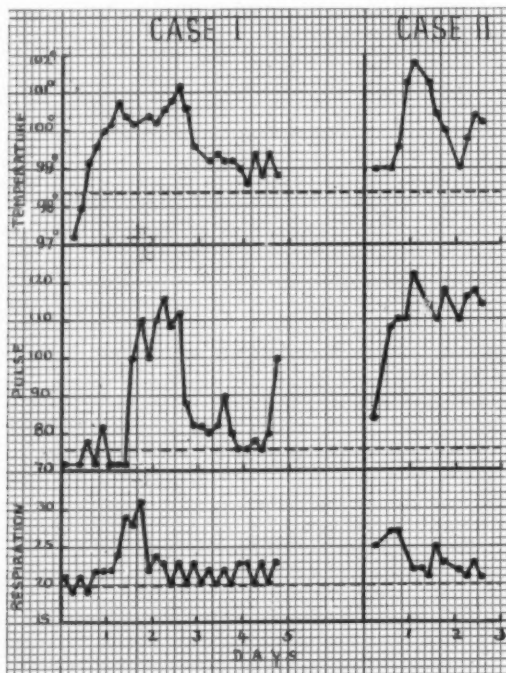


FIGURE I.

CASE II.—The wife, aged forty-two years, was found to be suffering from surgical shock and a through-and-through perforating wound of the pendulous portion of the left breast. There were fragments of brick and clothing in the wound. There was no apparent injury to the lung or chest wall.

Two hours after her admission to hospital the wound was excised and packed with "Vaseline" gauze, the anæsthetic agent being nitrous oxide and oxygen.

On the following day, September 1, she complained of pain in the right side of the chest, more acute on inspiration. The temperature rose to 102° F. (see Figure I, Case II). There were no abnormal physical signs in the chest, but her general condition was poor. She had a slight non-productive cough.

On September 2 there were some fine crepitations at the base of the right lung posteriorly. The breath sounds were vesicular in character and the percussion note was resonant. A radiograph could not be taken, as the patient was too

ill. A leucocyte count revealed 8,400 white corpuscles per cubic millimetre; 80% of these were neutrophile cells, 15% small lymphocytes and the rest large lymphocytes. Her general condition remained poor, and on September 3 the patient suddenly collapsed and died.

An autopsy was performed, with the following findings. The body was that of an obese middle-aged woman. There was a clean healing wound on the under surface of the left breast. There were no other external signs of violence. All systems, including the cardio-vascular, were normal, excepting the respiratory system, to which the lesions were confined.

The pleural cavities contained no fluid. There were some patchy hæmorrhagic areas in the substance of the lower lobe of the left lung. The upper and middle lobes of the right lung showed many scattered areas of hæmorrhage. The lower lobe was in a state of apparent red hepatization, crepitant to the touch, and exuding frothy blood-stained fluid when squeezed. This appearance was most pronounced in a zone, half an inch wide, just under the visceral pleura covering the costal surface of the lobe. There was no evidence of pulmonary embolus.

Microscopic examination of the lung substance showed that the blood stained areas were due to an extravasation of blood into the alveoli and the interstitial substance of the lung itself.

The post-mortem examination did not explain the actual mechanism whereby sudden death occurred.

Lung blast is a lesion of the lungs which follows the exposure of the body to the blast wave of an exploding bomb. The chest wall shows no sign of injury, the lesion being found in the lungs alone. Scattered extravasations of blood into the alveoli and interstitial tissues are found.

There have been various theories as to the cause of this condition. Some observers considered that the blast wave went through the mouth and down the tracheo-bronchial system, so injuring the lung by a sudden rise of intrapulmonary pressure. Others considered that the suction wave following the blast wave created a sudden lowering of pressure in the lungs through the tracheo-bronchial system, so causing the lesions. The post-mortem findings in Case II tend to support Zuckerman's experimental evidence that the blast wave impinges on the thoracic wall so violently and quickly that the ribs are suddenly compressed onto the lung, bruising its substance. The striking point in this case was the intensification of the hæmorrhage immediately beneath the visceral pleura on the costal surface of the right lung—that is, the portion of lung which would receive the greatest force of the impact.

The condition revealed itself clinically in both these cases twenty-four hours after the bomb explosion, which is the usual occurrence in this lesion. It teaches that all persons subjected to blast, no matter how unaffected they seem at the time, should be observed for twenty-four to forty-eight hours in case lung blast has occurred.

In Case I the lower lobe of the right lung alone was affected, and the patient quickly recovered; but in Case II all lobes of the right lung and the lower lobe of the left lung were affected. The patient suddenly died for no apparent reason, and this sudden collapse has been observed in other cases of lung blast alone. It is probable that many persons found dead near the scene of a bomb explosion, who show no external lesion, have the condition of lung blast. The cause of death in these cases is not properly understood at present.

Apart from clinical diagnosis, radiography will confirm this condition, showing scattered shadows in the lungs, which correspond to the areas of blood extravasation. This was well brought out in Case I.

Abdominal Injuries.

There was only one patient with a perforating wound of the abdomen, and he was suffering from almost total evisceration with gross laceration of the ascending colon. Death occurred a few minutes after his admission to hospital.

There were two cases of cortical injuries to the kidney due to blows from falling objects on the back of the prone subject. The usual signs and symptoms were present—namely, backache, loin tenderness and hæmaturia, all of which in both instances disappeared within a week.

Injuries to the Nervous System.

Head injuries were mostly caused by falling objects, and resulted in concussion and brain contusion as seen in civil accident surgery.

There was one interesting case of complete nerve deafness due to the effects of blast; the patient spontaneously recovered within a few days.

Regarding the peripheral nervous system, there were two cases of nerve palsy, facial and radial, caused by blows from flying stones. The lesion was probably a concussion effect.

In one case the whole of the posterior wall of the sacral canal with the overlying muscles was removed. There was no injury to the sacral nerves, excepting their dorsal rami. Transitory retention of urine and faecal incontinence occurred, but control of bladder and bowel rapidly returned.

Facio-Maxillary Injuries.

Facio-maxillary injuries were uncommon; only three patients were admitted to hospital. Two of these had sustained a fracture of the nose from flying missiles, and the third had multiple facial lacerations due to flying glass.

Glass Injuries.

Apart from the last-mentioned case there were only two other patients with injuries due to flying glass. This is a noteworthy feature, especially when one saw the enormous quantities of shattered glass lying about after an air raid. This was due to the good sense of the populace in taking cover rapidly on the approach of aeroplanes.

The effect of flying glass on the human body can be appalling.

One of the patients brought to hospital had been standing in his hallway behind a door with many glass panes. A small bomb exploded on the footpath and blew the shattered glass onto the patient. He sustained a severely lacerated face and lips. There were many pieces of glass in the wounds and conjunctival sacs. His clothes were cut to pieces. There were multiple superficial lacerations of the abdominal and chest walls. Both thighs were severely lacerated and his left quadriceps muscle was replaced by a mass of glass fragments. In all these lacerations there were multiple pieces of glass. When the bomb exploded he had thrown up his hands to protect his face. The glass had impinged on the dorsum of his forearms and hands, severing several of the extensor tendons. Many pieces also entered the right wrist joint in several places.

Shrapnel Wounds.

There were only six cases of shrapnel wounds, all caused by the shells of the anti-aircraft barrage; shrapnel bombs, as yet, have not been used by the Germans. They occurred in the first few days of the air raids, before the Londoner learnt to take cover when the barrage started.

The size of the shrapnel fragments varied from a pin-head to pieces weighing half a pound; all were very irregular and jagged, and inflicted very serious wounds. The fragments travel a long way from the wound of entrance and cause a great deal of soft tissue damage, often breaking any bone encountered. Their ultimate destination is usually impossible to ascertain without adequate radiological facilities.

Burns.

Strange to say, there was only one patient with burns severe enough to require his admission to hospital. This patient had burns of the face and forearms due to bomb flash. He threw up his hands to protect his face and consequently he sustained burns of the dorsum of the hands, forearms and face.

There were, of course, many deaths from burning due to the explosion of oil bombs; but death was usually instantaneous, the bodies being charred and almost unrecognizable.

Many people sustained burns on the hands and in other situations whilst extinguishing incendiary bombs; but these were usually suitable for treatment in the outpatient department.

Psychological Effects.

Communication with the sector psychiatrist revealed that there were very few cases of psychological breakdown due to air raids on London. He stated that there were more cases of neurosis during the uncertain days before the declaration of war, and that once the uncertainty was past the number of cases diminished.

Only one patient with an anxiety neurosis was admitted to the hospital during this time—a girl, aged seventeen years, who had had a nervous breakdown some two years previously.

There were two cases of attempted suicide.

A woman, aged forty-five years, had cut her throat, and a man, aged forty-six years, had taken "Lysol". Both admitted that the cause of their action was the fear of bombings. These patients had been previously known to be suffering from a manic-depressive psychosis.

It is not out of place at this point to comment on the high morale and great courage in the face of trial and danger displayed by the population of the East End, a morale common to the whole of England.

Other Injuries.

Among other indirect effects of the air raids there were two patients whose peptic ulcers perforated whilst they were running to a shelter.

Immediate Mortality.

In the "immediate mortality" series of patients there were four deaths in hospital. Those who died were: (i) a patient with a crushing injury of the chest, (ii) a patient with lung blast, (iii) the patient (previously mentioned) with evisceration of the abdominal contents, and (iv) a boy, aged eighteen years, who had a severe perforated wound of the knee joint associated with gross destruction of the lower third of the femur.

Treatment.

Prevention being better than cure, especially in air raid injuries, it is necessary to point out that many casualties in the early days were avoidable. The public remained in the streets to watch the air battles and the bursting shells, so exposing themselves to the effects of bomb explosions and shrapnel. These avoidable casualties were greatly diminished in number when the public learned to take shelter immediately the barrage started.

Long before air raids commenced adequate arrangements had been made concerning blood transfusions. The hospital had a list of over 1,000 donors of all types, and each week blood was taken and stored in the refrigerators ready for immediate use. If any blood remained longer than a week, the supernatant plasma was removed and stored in separate bottles. This could be kept for an indefinite time in the refrigerators. There were always about 15 to 20 pints of plasma available for immediate use.

Immediately on admission to hospital, and after a quick examination, all patients were given a hypodermic injection of one-third of a grain of morphine and 3,000 units of tetanus antitoxin. They were then treated for shock, which, while initially severe, disappeared rapidly with treatment with warmth and additional morphine when necessary. In only two cases was it necessary to give plasma intravenously.

When the shock had subsided, usually in about two hours, clothing was removed and an attempt was made to clean away the dust and plaster covering the patient. Those patients requiring it were then radiologically examined, in order to localize foreign bodies or shrapnel fragments.

With nitrous oxide and oxygen, supplemented when necessary by ether, as the anæsthetic, operation was then performed; and consequently, as most patients were admitted to hospital within two hours of receiving an injury, their wounds were attended to well within the safe six-hour limit.

Most of the patients requiring surgical intervention were those with compound fractures, penetrating joint wounds or lacerations, with or without foreign bodies.

Compound fractures were treated by routine *débridement* and the removal of obvious foreign bodies. The resulting wound was packed with "Vaseline" gauze and a non-padded plaster splint was applied in the usual manner. This was the method as used by Winnett-Orr in the Great War, and popularized by Trueta in the Spanish civil war. These injuries were usually so gross, often with the loss of large amounts of skin and destruction of muscle, that there was no question of primary closure.

In the case of penetrating joint wounds, *débridement* was performed in the usual manner and the joint interior was inspected through the wound. There was usually no difficulty in doing this, owing to the large size of the perforation. Foreign bodies were removed and the joint was washed out with saline solution. The synovial membrane was usually very severely damaged and could not be repaired. "Vaseline" gauze was then inserted down to the joint cavity. Non-padded plaster casts were applied in the usual manner.

A noteworthy thing was the immediate relief of pain and the improvement in the well-being of the patients after the application of plaster casts, which prevented movement of the injured limb.

In the case of shrapnel wounds or wounds with deeply situated foreign bodies, radiological localization was first performed, and the track down to the foreign body was then excised whenever possible, due regard being paid to important anatomical structures. If attempted removal of these foreign bodies would endanger important blood vessels or nerves, then they were allowed to remain, *débridement* being performed as far as possible. In all cases the wounds were left open and packed with "Vaseline" gauze; no attempt at suture was made. In none of these cases was the tourniquet used.

Patients with burns were treated by the tannic acid and silver nitrate technique, which had already proved its efficacy in the treatment of severely burnt men from the Dunkirk evacuation. It is by far the most efficient and labour-saving method of using tannic acid in the treatment of burns.

An important point in the after-treatment was the routine administration of sulphapyridine as soon as possible after operation.

In addition, it was necessary to remember that these patients had suffered from one air raid, and hence required an efficient sedative for the nights during which they were in a hospital in an area undergoing nightly raids. Removal to a safe area had a very cheering effect on most patients, when they knew they would get uninterrupted sleep. Those patients who were not fit for discharge within a few days were all transferred to hospitals outside London as soon as they were fit to travel.

Whilst in this hospital no patient developed gas gangrene, tetanus or severe wound infection.

General Discussion.

The arrangements made by the various authorities regarding ambulance facilities for the collection and transport of the injured to the hospitals were very efficient and adequate. In most instances patients were admitted within two hours of receiving injury, the exception being those unfortunates who were buried under tons of concrete and similar debris. Regardless of falling bombs and fires, the ambulances went out collecting the wounded immediately an "incident" was reported. The casualties were taken either to a first-aid post near the scene of the bombing, where morphine could be administered or haemorrhage stopped, or else direct to a hospital.

Experience in the East End showed that many small hospitals, each with a hundred beds or so, were better than one large central institution. Many hospitals were bombed, yet adequate facilities were still available close by, owing to this decentralization. Again, when a large number of casualties occurred suddenly, these were able to be divided among several hospitals; the danger of any one surgical staff having to cope with too great a number of patients at any one time was thus lessened.

Those hospitals in the danger zone were regarded as casualty clearing stations, from which patients, after being treated, were transferred as soon as practicable to base hospitals outside London. With efficient evacuation to the base one small hospital could cope with a large number of casualties.

In those hospitals likely to be in continual danger from indiscriminate bombing, adequate protection for the occupants must be given in the form of specially reinforced roofs, doors and windows. The top floors must be evacuated, since they are the dangerous floors, where most damage from bomb explosion occurs. Adequate air raid shelters should be constructed for those personnel who are not on duty at the time of the air raids. Underground operating theatres and, if possible, underground wards should be provided, because operations were being continually performed during the London air raids, which lasted usually from dusk to dawn. These hospitals must have emergency lighting plants, as outside wires or power-houses may be bombed. There should also be some method of water storage in case of damage to water mains. Some form of steam sterilization and cooking, worked from a boiler, is essential in case of damage to power cables or gas mains. After a raid, telephonic communication is often impossible for a time at least. This can be overcome by a system of runners or pedal or motor cyclists.

It is not out of place here to record a few words on the subject of air raid shelters. The public availed themselves of the following types of shelters during the raids: (i) basement shelters, (ii) stairway and corridor shelters, (iii) Anderson shelters, (iv) surface brick shelters, (v) trench shelters, and (vi) deep shelters. These are considered *seriatim*.

(i) Many public shelters were constructed in the basements and cellars of shops, blocks of flats and other tall buildings. The private basement shelter was usually found in the old-fashioned home with two or more stories, the cellar being specially reinforced with concrete.

These shelters were good except in cases of direct hits, when the house usually collapsed into them. A further grave disadvantage was that they might be flooded by burst water mains or by water used for fire fighting; many cases of drowning were caused in this way when the exits were blocked.

(ii) When a house received a direct hit it was often noticed that the stairways and corridors protected by rooms on either side were left standing, so that if it were necessary to stay in a house during a raid these would be the safest places. In any case one would be much safer there than running to a shelter through streets on which bombs or shrapnel were falling. Even by crouching under a kitchen table people were saved when the house itself was wrecked.

(iii) The Anderson shelter, properly constructed, was very efficient against blast or flying missiles or even near-hits. Naturally, it could not withstand a direct hit.

(iv) The surface brick shelter was built on pavements as a refuge to passers-by caught in the streets during a raid, and afforded efficient protection against flying missiles.

(v) The trench shelter was common in London; it consisted of deep trenches roofed by concrete and earth, and afforded good protection against anything except a direct hit.

(vi) Deep shelters were represented in London by certain of the tubes, and the public quickly appreciated them in preference to other shelters. Not only were they safe, but their depth also prevented the noise of the anti-aircraft barrage from reaching them, and so allowed the occupants to sleep.

To my mind the ideal shelter should be 30 to 40 feet underground, adequately constructed to provide sufficient room for sleeping, be well ventilated and have warmth and sewerage facilities. Its depth would protect it from a direct hit and abolish the noises caused by falling bombs and the anti-aircraft barrage. The raids on London were of eight or more hours' duration every night, and the

public rapidly appreciated the fact that the tubes afforded safety, warmth and adequate ventilation with the absence of noise.

Conclusion.

In conclusion I wish to express my deep admiration for the morale and courage of the Londoner, who was determined to carry on as long as was necessary in spite of the nightly air raids. It was an inspiration to work among such people.

THE INCIDENCE OF HÆMOLYTIC STREPTOCOCCI IN THE THROATS OF OBSTETRIC NURSES: RESULTS OF TREATMENT BY TONSILLECTOMY AND SULPHANILAMIDE.¹

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DURING the past two and a half years we have been investigating the occurrence of hæmolytic streptococci (Lancefield Group A) in the throats of the nursing staff of the Women's Hospital, Sydney. We have endeavoured to discover: (i) the incidence of this organism in the throats of nurses resident in the hospital; (ii) the effect of the presence or absence of tonsils; (iii) what methods, if any, will eradicate the infection.

In order to assess properly the significance of our findings, it is necessary to know something of the environment in which the staff work. The hospital has 290 beds, divided as follows: (a) an obstetric department with 223 beds, (b) a gynaecological unit with 31 beds, (c) an isolation block away from the main hospital with 36 beds. All patients with puerperal infection discovered in the obstetric section are transferred to the isolation block, and all patients with septic post-partum infections from outside the hospital are admitted there. The nurses working in the isolation block are quartered in the building, and so are in infrequent contact with the remainder of the staff, who live in the Nurses' Home.

The Nursing Staff.

At any one time the nursing staff has consisted of from 125 to 160 nurses, of whom about one-third are sisters and staff nurses and the remainder trainees. The length of time that the former remain at the hospital varies; but on the average it is longer than that spent by the trainees, most of whom enter for a course of nine months, a smaller number, one of eighteen months. Each trainee works in the isolation block for at least one month during her

¹This work was carried out with the aid of grants from the National Health and Medical Research Council.

training. This question of time and duties at the hospital is referred to because it was noted that the majority of the nurses who were subsequently found to harbour hæmolytic streptococci in the throat were not carriers at the first swabbing, and that the most common time for contracting the organism was during the month spent in the isolation block while they were working among patients with known streptococcal infections of the genital tract.

During 1938 the entire nursing staff had throat swabs taken every two months. Some nurses had swabs taken more frequently—for example, those with clinical respiratory tract infections, suspected contacts, or known carriers. From the beginning of 1939 the entire staff had swabs taken at intervals of three months, and many more individual swabs were taken at much shorter periods. In all, 3,750 throat swabbings from nurses were taken during this investigation.

Technical Methods.

The technique of the swabbings was as follows: the swab was passed firmly over both tonsils, or tonsillar fossæ, then across the posterior wall of the bucco-pharynx, and as high as possible behind the soft palate into the naso-pharynx. All throat swabs were plated onto special horse blood-agar plates (Ward and Rudd, 1938)⁽¹⁾ and incubated aerobically for twenty-four hours. Subcultures were then made to obtain pure cultures of any β -hæmolytic streptococci present.

During 1938 β -hæmolytic streptococci were differentiated between Lancefield's Group A or "not Group A" by means of the two-tube cultural test originated by Ward and Rudd (1938).⁽¹⁾ Those organisms which this method indicated as belonging to Group A were then serologically typed according to Griffith's methods. In 1939 an additional test to distinguish Group A organisms was used—namely, the growth characteristics on special maltose and horse blood-agar plates, as used by Professor Ward in unpublished experiments. Also at this time type sera from further Australian strains were obtained.

During the two years all Group A hæmolytic streptococci which we were unable to type serologically were submitted to Lancefield's precipitin test⁽²⁾ as a safeguard against non-Group A variants, which can give indecisive results with the cultural tests. Therefore, every strain referred to in this paper as untypable is known to belong to Group A. In 1940 it was decided to use Lancefield's precipitin test on all β -hæmolytic streptococci isolated.

Table I shows that during two and a half years, 442 nurses were working at the hospital, and of these, 80 (nearly one in every five) were at some time carriers. Further consideration of this table shows that of the 297 nurses with complete or partial tonsils, 20 were found to be carriers at their first swabbing (7%), whereas of the 145 nurses with complete absence of tonsils, only two (1.4%) were carriers.

This difference is statistically significant (P lies between 0.02 and 0.05). As possible explanations of this difference, it is suggested either that hæmolytic streptococci will invade more easily a throat with tonsillar tissue than one without, or that once it has become established, it is more difficult to dislodge the organism from the

TABLE I.
Incidence of Infection.

Condition of Tonsils.	Number of Nurses.	First swab "+".		First swab "-" but subsequent swab "+".		Percentage of Nurses Infected. (Total).	Number of Clinical Infections.
		Number.	Percentage.	Number.	Percentage.		
Tonsils present	257	17	6.6	33	13.8	19.8	12
Tonsillar tissue present	40	3	7.5	13	32.5	40.0	4
Tonsils completely absent	145	2	1.4	12	8.4	9.0	4
Total	442	22	4.5	58	13.8	19.0	20

"+"=hæmolytic streptococci (Group A) present; "-"=these organisms absent.
Ten nurses acquired two types, one nurse three types, while at the hospital.

TABLE II.
Methods of Treatment.

Condition of Tonsils.	Method of Treatment.	Number of Nurses.	Results.		
			Number Successful.	Number Failed.	Number Not Known.
Tonsils present	Local	24	16	8	—
	Tonsillectomy	23	19	2 ¹	2
	Sulphanilamide	3	2	1	—
Remnants of tonsils	Local	4	4	0	—
	Tonsillectomy	9	7	1 ¹	1
	Sulphanilamide	3	2	0	1
Tonsils absent	Local	12	12	0	—
	Sulphanilamide	2	1	1	—
Total .. .. .	.. .. .	80	63	13	4

¹ These nurses were successfully treated with sulphanilamide after failure with tonsillectomy.TABLE III.
Effect of Tonsillectomy on Carrier Nurses.^{(1) (2)}
Complete Tonsils.

Nurse.	Time at Hospital with "++" Throat Swabs.	Time Throat Swabs "++" Before Operation.	Type of Hemolytic Streptococci.	Results.	
				Time from Operation to last Throat Swab.	Throat Swabs.
A.R.	7 months (6).	3 weeks (3).	XVII.	12 weeks.	4 "—" throat swabs.
B.A.	3 weeks (1).	7 weeks (3).	Untyped.	3 weeks.	3 "—" swabs.
D.O.	First swab "++".	12 weeks (4).	Alli.	11 weeks.	7 swabs, 3 "++" with few colonies; last 3 swabs "—".
F.O.	First swab "++".	8 weeks (5).	Untyped.	5 months.	10 "—" swabs.
F.L.	11 weeks (2).	13 weeks (11).	XI.	6 weeks.	5 "—" swabs.
J.O.	(a) 4 months (2).	(1).	Untyped.		
	(b) 5 months (2).	(1).	VIII.		
	(c) 9 months (5).	1 month (4).	XI.	6 months.	During 4 months after operation 28 swabs (20 "++", 8 "—"). Then sulphanilamide, followed by 9 "—" swabs in 2 months.
J.A.	7½ months (5).	5 weeks (2).	Alli.	5 weeks.	3 "—" swabs.
K.I.	6 weeks (2).	4 months (12).	XVII.	6 months.	10 "—" swabs.
L.A.	First swab "++".	6 months (4).	VI.	2 years.	13 "—" swabs.
L.O.	2½ months (2).	5 weeks (5).	Wade.	3 months.	8 "—" swabs.
L.E.	First swab "++".	3 weeks (4).	Gerrard.	5 months.	8 "—" swabs.
M.N.	First swab "++".	3 weeks (1).	Untyped.	4½ months.	5 "—" swabs.
C.A.	6 months (5).	11 months (9) (4 swabs "—").	Untyped.	1 year.	7 weeks after operation, Type XVII isolated. In next 6 months 28 swabs (21 "++", 7 "—"). Sulphanilamide given.
M.C.	First swab "++".	4 months (5).	Untyped.	3½ months.	See Table IV.
M.O.	First swab "++".	2 months (4).	XI, Gerrard.	6 months.	7 "—" swabs.
R.O.	First swab "++".	10 weeks (8).	Gerrard.	9 months.	11 "—" swabs.
S.T.	4 months (2).	1 week (1).	Untyped.	17 months.	10 "—" swabs.
V.A.	First swab "++".	3 weeks (2).	XI.	4 months.	5 "—" swabs.
W.A.	5 weeks (6).	10 days (1).	XII.	4 months.	12 "—" swabs.
W.L.	6 months (2).	4 weeks (2).	XI.	5 months.	6 "—" swabs.
W.O.	(a) First swab "++".	17 months (11) (3 swabs "++").	Untyped.	9 months.	9 "—" swabs.
	(b) 5 months (5).	2 months (8).	Alli.	9 months.	9 "—" swabs.

Partial Tonsils.

C.O.	First swab "++".	3 weeks (10).	XXVII.	5 months.	9 "—" swabs.
D.R.	(a) 13 months (7).	11 weeks (2).	XII.		
	(b) 5 weeks (2).	8 weeks (4).	XI.	11 months.	First 4 months after operation, 11 "—" swabs, 6 "++" swabs. Then sulphanilamide (unsuccessful). See Table IV.
H.O.	10 months (5).	3 months (5).	XXVIII.	12 months.	5 "—" swabs.
J.O.	5 weeks (3).	3 weeks (6).	XXXVII.	5 months.	10 "—" swabs.
M.A.	4 months (2).	14 weeks (2).	Alli.	12 weeks.	28 swabs, 12 "++", 16 "—".
S.W.	First swab "++".	2 weeks (3).	Krone.	5 months.	9 swabs (2 were "++").
S.M.	19 months (5).	2 months (11).	(1) Alli.	10½ months.	18 swabs (6 were "++" during first month), 12 "—" in last 9 months. Left hospital after operation.
G.R.	7½ months (6).	5 weeks (1).	(2) XVII.	13 months.	1 "—" swab (after 13 months).

¹ Figures in parentheses represent the number of throat swabs during the time indicated.
² "++" and "—" indicate hemolytic streptococci (Group A) present or absent.

first with Type XII and later Type XI; but she was unable to tolerate the drug, so treatment was discontinued.¹

¹ Subsequent to the completion of this paper Nurse D.R. has had a second course of sulphanilamide therapy and has had nine "negative" throat swabbings during four months.

Treatment by Sulphanilamide.

Williams *et alii*⁽³⁾ recently demonstrated that it was possible, by the oral administration of sulphanilamide, to attain a reasonably high concentration of the drug in the saliva. We had obtained no effective results from local

applications of sulphanilamide in the form of throat paints or throat tablets, nor had the spasmodic administration of small doses without particular plan or supervision led to the disappearance of hæmolytic streptococci from an infected throat. Consequently, after reading the publication referred to above, we decided to endeavour, by giving adequate doses of sulphanilamide, to raise the concentration of free sulphanilamide in the saliva to at least seven milligrammes per 100 cubic centimetres, and to maintain it at that concentration for about five days. To achieve this an initial dose of two grammes was given, followed by one gramme at intervals of four hours, six doses being given in each twenty-four hours; about the fourth or fifth day of treatment estimations were made of the free sulphanilamide in the blood and saliva, and the dose was modified according to the results shown. In order to obtain, as nearly as possible, a true estimation of the percentage of the drug being secreted, saliva was collected at least three hours after the preceding dose of sulphanilamide, and the nurse was instructed to rinse the mouth thoroughly with water or saline solution before expectorating.

During treatment the nurse was kept in bed and the usual precautions were taken concerning diet and other drugs. A blood count was made before and during treatment, and the drug was discontinued as soon as pronounced intolerance was shown. This happened twice,

in one instance (Nurse D.R. referred to above) after such small doses that the history is not included in Table IV.

In the other case (Nurse P.E.) tachycardia developed after four days' treatment. At her own request the nurse was allowed a second course a month later, and received 33 grammes of sulphanilamide during eight days. After this, on two occasions during ten days no hæmolytic streptococci were found on throat swabbings, but she then left the hospital, so the final result must be regarded as uncertain.

Table IV shows details of the ten nurses who received sulphanilamide treatment. It was successful in seven cases, uncertain in one, and a failure in two. The unsuccessful cases deserve consideration. Both nurses had previously had radical antrostomy performed. In addition, one (M.E.) had unhealthy-looking tonsils and the other (H.A.) had had mastoidectomy and tonsillectomy.

Discussion.

We can only conclude that nurses working in an obstetric hospital, to which is attached an isolation block for the treatment of puerperal infections, run considerable risk of acquiring hæmolytic streptococci in the upper respiratory tract, and it is shown conclusively that the presence of tonsillar tissue renders the throat a more favourable habitat for the organism.

The increased number of hæmolytic streptococcal infections in this hospital during the late winter and early

TABLE IV.¹
Treatment with Sulphanilamide.

Name and Serological Type of Organism.	Previous History.	Number of Days' Treatment.	Amount of Sulphanilamide. (Grammes.)	Amount of Free Sulphanilamide in Blood. (Milligrammes per centum.)	Amount of Free Sulphanilamide in Saliva. (Milligrammes per centum.)	Result of Treatment.
C.E. Type XVII.	Tonsillectomy in childhood. Remnants dissected out five years earlier. T.S. "—" during 8 weeks, "+" during 6 months (10 swabbings).	12	52	3rd day: 8.0. 5th day: 10.0.	5th day: 8.7.	Successful. 9 "—" T.S. during 7 months.
C.A. Type XVII.	5 "+" T.S. during 11 months. Tonsillectomy (see Table III) 7 weeks later infected by new Type XVII. 21 "+" T.S. during next 6 months.	8	54	2nd day: 8.0. 4th day: 12.4. 8th day: 18.0 9th day: 25.0.	8th day: 12.4.	Successful. 13 "—" T.S. during 10 months.
W.H. Type Gerrard.	Large tonsils. 10 "+" T.S. during 6 months.	8	33	7th day: 12.5.	7th day: 11.0.	Successful. 8 "—" T.S. during 4 months.
M.E. Type Wade.	Previous radical antrostomy. Unhealthy tonsils. 6 "+" T.S. during 3 weeks.	8	35	5th day: 10.0.	5th day: 11.8.	Infection recurred. 9 "—" T.S. during 4 months, followed by 4 "+" T.S. in last three weeks.
J.O. Type XI.	Many "+" T.S. during 18 months, with intervals of "—" T.S. Tonsillectomy (see Table III). 20 "+" T.S. during next 7 months.	7	36	3rd day: 5.3. 5th day: 11.1. 7th day: 13.3.	3rd day: 3.2. 5th day: 4.1.	Successful. 9 "—" T.S. during 2 months.
B.O. Type Gerrard.	Large tonsils. 3 "—" T.S. during 2 months. 7 "+" T.S. during 6 weeks.	6	29	5th day: 11.6.	Not estimated.	Successful. 6 "—" T.S. during 3 months.
R.Y. Type XXX.	Small remnants of tonsillar tissue. 6 "—" T.S. during 7 months. 16 "+" T.S. during 9 weeks.	7	25	4th day: 18.2. 8th day: 7.3.	4th day: 20.0.	Successful. 8 "—" T.S. during 4 months.
P.E. Type Krone.	Tonsillectomy 7 years earlier. Remnants still present. 6 "—" T.S. during 9 months. 11 "+" T.S. during 3 months.	1st course: 4 days. 2nd course: 8 days.	19 33	4th day: 10.7. 4th day: 12.5.	4th day: 9.1. 5th day: 10.6.	Unsuccessful. 3 "+" T.S. in 4 weeks. Uncertain. 2 "—" T.S. in 10 days. Left hospital.
T.A. Type Hempston.	Tonsillectomy 11 years earlier. Remnants still present. 7 "+" T.S. during 7 weeks.	6	28	4th day: 17.0.	4th day: 17.0.	Successful. 6 "—" T.S. during 5 months.
H.A. Type XVII.	Mastoidectomy. Tonsillectomy. Radical double antrostomy. 1 "—" T.S. during 7 weeks. 9 "+" T.S. during 5½ months.	1st course: 5 days. 2nd course: 8 days.	25 42	4th day: 14.0. 5th day: 10.0.	4th day: 15.0. 5th day: 9.0.	Unsuccessful. 5 "+" T.S. during 2 months. Unsuccessful.

¹ T.S.—Throat swabbing.

spring of 1939 (see Figure 1), of course, greatly added to the risk. This local outbreak was coincident with overcrowding; there were more births in the hospital during the third quarter of 1939 than during any similar period before or since.

With regard to methods of treatment, when tonsillectomy can be performed, the prognosis is favourable. However, when tonsillar tissue is completely absent, sulphanilamide therapy in selected cases and under strict control can be expected to eliminate infection.

It appears that sulphanilamide is not likely to be effective when pronounced abnormality of the upper respiratory tract is present, and we agree with the suggestion of Lucy M. Bryce and Phyllis Tewsley⁽¹⁾ that a medical examination before the commencement of training should be the means of excluding such persons from midwifery units.

Summary.

1. Throat swabbings (3,750) were taken from 442 nurses during a period of two and a half years. Hemolytic streptococci (Lancefield's Group A) were recovered from 80 nurses (18%).

2. Of nurses whose tonsils were either present or incompletely removed, 66 among 297 (22%) were at some time carriers, and the incidence among nurses whose tonsils were completely absent was 9.7% (14 among 145).

3. Tonsillectomy has proved successful in eliminating hemolytic streptococci from the throats of 26 of the 29 nurses whose subsequent history is known.

4. Sulphanilamide therapy, in adequate doses and under careful supervision, is shown to be a valuable method of treatment when other measures have failed.

Acknowledgements.

Our grateful thanks are due to Professor H. K. Ward, the University of Sydney, for help and advice, to Dr. E. B. Durie, pathologist to the Women's Hospital, for sulphanilamide estimations, and to Miss H. Newton Turner, biometrician to the McMaster Animal Health Laboratory, for help with statistics.

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⁽¹⁾ H. K. Ward and G. V. Rudd: "Studies on Hemolytic Streptococci from Human Sources. I. The Cultural Characteristics of Potentially Virulent Strains". *The Australian Journal of Experimental Biology and Medical Sciences*, Volume XVI, 1938, page 181.

⁽²⁾ R. C. Lancefield: "The Serological Differentiation of Human and Other Groups of Hemolytic Streptococci", *The Journal of Experimental Medicine*, Volume LVII, 1933, page 571.

⁽³⁾ S. Williams, B. Splatt and R. Jakobowicz: "The Concentration of Sulphanilamide in the Saliva Following Oral Administration", page 120.

⁽⁴⁾ L. M. Brice and P. Tewsley: "A Bacteriological and Clinical Study of the Professional Personnel of Maternity Hospitals, with Special Reference to Carriers of Hemolytic Streptococci", *THE MEDICAL JOURNAL OF AUSTRALIA*, April 9, 1938, page 639.

Reports of Cases.

ALMOST COMPLETE OCCLUSION OF THE VAGINAL ORIFICE FOLLOWING CHILD-BIRTH.

By ELLA MACKNIGHT, M.D., D.G.O.,
Melbourne.

Clinical Record.

THE patient, E.W., aged twenty-three years, married, attended the out-patient clinic at the Queen Victoria Hospital on January 2, 1940, complaining of a vaginal discharge of one year's duration, and of "something wrong" in the vulval region since the birth of a baby eighteen months before. The doctor who had attended her gave the following information. The patient had had her first baby eighteen months before. It was one month premature, and lived about one and a half hours. The delivery was natural. The weight of the baby was not known. No further details could be obtained. The patient stated that she had been sore in the vulval region during the puerperal period, that she had not been examined vaginally after the birth of the child, and that coitus had not been attempted till more than three months after, when it was found to be impossible. Menstruation had been normal. No abnormality had been noticed in

regard to micturition. Prior to the labour there had been no dyspareunia.

On examination the inner surfaces of the *labia minora* were continuous across the mid-line except for a small opening in the region of the urethra. Some yellowish discharge came from this orifice. Later it was found that the fusion of the *labia minora* did not extend right up to the clitoris, so that a small opening was also left just posterior to the latter.

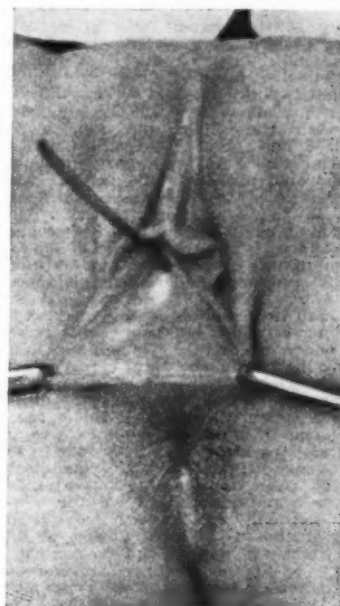


Figure showing condition before operation. The posterior ends of the labia are held apart by forceps. The probe is in the only orifice of the septum.

At operation on January 18, 1940, the septum occluding the vaginal orifice was found to be about a quarter of an inch in thickness anteriorly, increasing to about half an inch posteriorly. It was quite soft, and there were few signs of scar tissue. The true urethral orifice lay about three-quarters of an inch cranial to the small orifice in the septum, which was forming a common outlet for the urethra and vagina. The vagina was half full of murky urine, but was of normal size and appearance. The cervix was lacerated transversely and eroded. No other abnormality was found. The septum was incised longitudinally and the upper and lower edges were sutured together horizontally.

The result was an apparently normal vulva and vagina. The patient was last seen on March 20, 1940, when the cervical erosion had healed and she had no dyspareunia.

Discussion.

This case is reported on account of the rarity of the condition. Obviously there must have been some lacerations at the time of delivery, with the probability of superadded infection, and the opposing raw surfaces had joined together in the healing process. Such an occurrence is extremely rare, and could happen only when no examination of the vulva and vagina was made at the end of the lying-in period. One other surprising feature is that such lacerations should occur with a premature baby.

ADHERENT PLACENTA PRÆVIA IN A TWIN PREGNANCY.

By MARY C. DE GARIS.

(From the Maternity Unit of the Geelong Hospital, Geelong.)

Clinical Record.

A MARRIED woman, aged thirty-six years, a *primipara*, was admitted to hospital on January 21, 1937; she was suffering

from headache and backache, and albuminuria and oedema were present. The patient had had no miscarriages and her menstrual periods had been irregular and painless; her teeth were in good order. Her husband was "in and out of work" and her diet was bad—she took no milk and no green or root vegetables except for potatoes. She had attended the antenatal clinic seven times.

On examination the uterus was found to be very large, and fluctuation was present. There was a history of twins in the father's family, and it was thought that two fetuses were present.

On February 16 the patient was given castor oil and quinine. The first stage of labour lasted for thirty-one hours; the second stage for the first child lasted four hours and forty-five minutes, and for the second child two hours and twenty minutes. The first child was a female which presented by the breech; difficulty was experienced with the arms, and forceps were applied to the head. The child was stillborn. The second child, deadborn, was a male; it presented by the head, and the head would not enter the pelvis. An attempt to use high forceps failed; version was performed, and forceps were applied to the aftercoming head. The first child weighed six pounds eight ounces and the second child eight pounds eight ounces. The third stage of labour lasted two hours and ten minutes; both placentae were adherent and were manually removed under general anaesthesia, with moderate loss of blood. Three perineal sutures were inserted, but not tied, and later they were taken out; no union had occurred. Both sacs were entirely separate from each other; one cord had a velamentous insertion. One placenta was adherent in the right upper uterine segment, the other in the right lower uterine segment (marginal or lateral), obstructing the entry of the presenting and other parts; it caused difficulty with the head of the second child and with the arms of both.

The patient's temperature repeatedly rose to 99° or 99.2° F. up till the twenty-fifth day. She was discharged from hospital on the twenty-ninth day, but attended the post-natal clinic for some time afterwards for a vesico-vaginal fistula, which gradually healed with local treatment. The first evidence of the fistula were gushes of fluid from the vagina, over which the patient had no control. The fistula was probably due to the prolonged second stage for the second child, when the contractions apparently drove the head against the pubis instead of through the brim; this was responsible for the necessity for version, when the application of forceps failed to bring the head into the pelvis.

The patient later had another baby, which lived, and another adherent placenta, which required manual removal. On both occasions she took the anaesthetic badly and caused much anxiety.

Discussion.

This experience with an adherent *placenta prævia*, which was not diagnosed until the manual removal, chiefly because I had not realized that such a thing could occur, demonstrated the mechanical hindrance for which the præval position is responsible. I should now feel tempted, if I were treating a *placenta prævia* by version, to deliver the placenta just before completing the delivery of the infant. This would minimize the difficulty with the arms, the delivery would then be much quicker and easier, and the baby would probably get from the placenta sufficient oxygen to survive, at least if the patient was a *multipara*. An adherent *placenta prævia* without hemorrhage before or during the first and second stages must surely be very rare.

Reviews.

MODERN PSYCHOLOGY.

THE book by C. C. Pratt¹ is a useful reminder to any whom it may concern of the present unscientific basis of psychology. Professor Pratt is an American psychologist with a deep respect for scientific method as such, and points out very clearly wherein, and to what extent, psychology, in its attempt to formulate laws of mind, has failed and must continue to fail so long as its data are falsely segregated from the observed data which form the basis of the physical and biological sciences. He predicts that the true picture of the self, if it is ever formulated, will be as unacceptable to common sense as originally the great new physical and

biological discoveries of the nature of life and the universe appeared ridiculous, not to say irreverent, to prejudiced lay minds. He emphasizes strongly that psychology, in the words of William James, is still "no science, only the hope of a science". It is impossible, he claims, by any of the methods used by different schools of psychology, to make real scientific generalizations about man's higher activities, as there are always too many individual factors involved. An attempt at partial escape from this dilemma, he says, is frequently made "by applying statistical averaging to large numbers of cases". But this, of course, to the orthodox methodologist is pure heresy.

This book contains practically nothing about medical psychology, its specialized interest lying mostly in the direction of academic psychology and philosophy. There is a description of Freud, however, as the father of the modern psychoanalytic school, which is both brilliant and illuminating. Freud, says Professor Pratt, is a literary psychologist, not a scientist, and if this view were generally kept in mind there would be no more wrangling about the validity of modern theories of the unconscious. As a would-be scientist, it behoves the average practical psychologist to remain silent on these unverifiable matters. Pratt pays a glowing tribute to Freud as a great artist whose "glamorous perceptions and piercing intuitions have done so much to enrich and deepen the meaning of life", but whose genius is akin to that of a great human writer like Dostolevsky rather than to a great scientist. Similarly, success in the treatment of maladjusted persons is to him an art rather than a science, and depends very little on a so-called scientific knowledge of human nature.

Altogether it is a good thing for loose thinkers, which most of us are, to be reminded so forcefully that science and its specific methods mean something very definite and that psychological data are not yet definable enough to form a proper subject matter for a true science.

A PRIMER OF DIETETICS.

PROFESSOR OSBORNE'S "Primer of Dietetics" is well known to Australians as an elementary text-book of nutrition. The publication this year of a fifth edition¹ is sufficient witness of its popularity.

Since the last edition of this booklet appeared, considerable advances have been made in nutritional science, particularly with respect to the mineral and vitamin content of foods and human requirements of these "accessory" factors. Most of these recent advances have been incorporated in the text of the fifth edition. Many persons, however, will think that too great an emphasis is still placed upon Calorie standards in the assessing of dietary requirements. It is possible that too close an analogy can be drawn between the human body and an engine, and that insufficient emphasis can be placed on non-energy food items, such as vitamin B₁, calcium, vitamin C and iron, which are far more likely to be deficient in the average dietary (and therefore more worthy of attention) than are Calories. With this Professor Osborne will surely agree, though we think that he must refer to Calorie standards when he states that the actual nutritive value of wholemeal bread is less than that of white, and that the percentage of nutritious matter in biscuits is greater than that in bread.

We utter a fervent "hear, hear!" to the author's advocacy for a system of pasteurization of milk in Australia similar to that already developed in America. But, in view of the dictum of the League of Nations Committee on Nutrition that all adults would benefit by the consumption of at least one pint of milk per day, we must question his view that the only adults who are the better for milk are expectant and nursing mothers. The author claims that the disadvantages of milk for adult life are that it is too bulky, has too little roughage, too little iron, and far too little carbohydrate; but it does provide an ideal source of calcium and phosphates, of first-class protein, of animal fat and vitamins; and although itself poor in iron, it promotes absorption of the iron in other foods.

It is a pity perhaps to draw attention to these points, because the subject matter of the book is so very well treated—obviously at the hand of a master. Professor Osborne's booklet is an extremely useful and practical exposition of the fundamentals of nutrition, whose value increases with the growing demand for a popular knowledge of food science.

¹"The Logic of Modern Psychology", by C. C. Pratt; 1939. London and New York: The Macmillan Company. Demy 8vo, pp. 261. Price: 10s. net.

¹"A Primer of Dietetics", by W. A. Osborne; Fifth Edition; 1940. Melbourne: W. Ramsay (Surgical) Proprietary Limited. Demy 8vo, pp. 55. Price: 2s. 6d. net.

The Medical Journal of Australia

SATURDAY, DECEMBER 28, 1940.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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THE DEFENCE MEDICAL SERVICES OF AUSTRALIA AND THE WAR: A REVIEW.

AFTER sixteen months of war it is fitting that in this, the last issue of THE MEDICAL JOURNAL OF AUSTRALIA for 1940, an attempt should be made to review the activities of the defence medical services of the Commonwealth. Such a review will be useful for more than one reason: it will give satisfaction to know that many practitioners have been prepared, often at great sacrifice, to devote themselves to the service of their country; in showing the extent of present activities it will allow others whose services have not yet been accepted to form some idea of what the needs of the future are likely to be; and it will serve as opportunity to leave an important message with those whose offers of service cannot for one reason or another be accepted, and with those who have not been in a position to volunteer. This review has been made possible by reason of information generously supplied at our request by Surgeon-Captain J. W. Carr, Major-General R. M. Downes and Air-Commodore T. E. V. Hurley, the heads of the medical services in the Royal Australian Navy, the Australian Military Forces and the Royal Australian Air Force respectively.

Medical Service of the Royal Australian Navy.

The Royal Australian Navy Medical Service has existed as a complete unit for twenty-eight years, including the period of the 1914-1918 war. Consequently, at the outbreak of the present war the problem presented was the expansion of an existing service and not the formation of an entirely new service. Organization is also made easier by the close connexion between the Royal Navy and the Royal Australian Navy, and consequently between the two medical services.

On the other hand, mobilization in the Navy is a matter of hours and not weeks, and therefore the first few days presented many difficulties. The thousands of reserve ratings and ex-members of the Royal Australian Navy pouring into the depots in the capital cities of the Commonwealth had to undergo a strict medical examination as to their fitness for sea service; and when it is realized that this had to be carried out in a few days and that a complete record of the men's physical state had to be effected, it will be obvious that the task was not an easy one, especially as the majority are immediately drafted to sea-going ships and possibly overseas, and are not retained in depots where more deliberate examination could be made. However, teams of doctors, working day and night, completed the work with creditable results.

The expansion of the Royal Australian Navy Medical Service to double or treble its peace-time requirements, as regards personnel, stores and hospital accommodation, presented many problems. Fortunately the Royal Australian Navy for several years prior to September, 1939, had greatly increased the nucleus of reserve medical officers, and had also, by the appointment of special instructors, increased the efficiency of the Reserve Sick Berth Branch, which forms the reserve nursing staff of the Royal Australian Navy. In addition, sufficient medical and surgical stores to carry over the first year of war had been accumulated at medical bulk stores and were available for immediate issue. Consequently, on the outbreak of war adequate numbers of medical officers and sick berth staff, and the necessary stores, were forthcoming.

The medical service of the Royal Australian Navy has also been extremely fortunate, as regards both its permanent service and its reserves, in the type of medical officers who have joined. Some of the latter were well-known doctors who cheerfully dropped everything ashore when called up at a few hours' notice. Others were young doctors recently qualified and suitable for service in destroyers and small ships, where the chief assets needed, besides professional skill, are a ready adaptability to what must appear at first very strange conditions. That these doctors were efficient is shown by the standard of health of the naval forces, which has been excellent during the first year of war.

Other problems to be faced were the institution of certain new procedures, such as complete blood grouping, the provision of transfusion apparatus, vaccination and inoculation, and at a later date microphotographic chest examination.

Up to the present the Navy has provided accommodation for the majority of its own hospital cases at Flinders Naval Hospital, Naval Wing, Randwick, and the various sick quarters in the State depots. Considerable expansion is taking place at Flinders Naval Depot, which will shortly have a self-contained hospital extended to accommodate up to 150 patients, with its existing operating, X-ray, pathological and physiotherapeutic department, and facilities for training the sick berth staff of the Royal Australian Navy.

Another department of the Naval Medical Service which has undergone considerable expansion is the dental services. Dental surgeons are included in the complement of the shore establishments at Garden Island, Sydney, and Flinders Naval Depot, and also in the larger ships.

Mechanical workshops to deal with prosthetic work are established at the shore establishments and also in one of the cruisers.

Surgeon-Captain Carr has stated that he is at one with the heads of the other two services in making an appeal to medical men and women who remain at home, to do everything in their power to conserve the interests of those who have left their practices for active service on the high seas.

The Australian Army Medical Service.

Since the outbreak of war the following units in the Australian Imperial Force have been staffed and equipped: thirteen field ambulances, five hygiene sections, four casualty clearing stations, nine general hospitals, two depots of medical stores, one hospital ship, one motor ambulance convoy, one convalescent depot, one mobile laboratory and a sea transport staff. In addition, medical personnel has been provided for battalions and regiments. These units have meant the appointment of 400 medical officers and 575 nurses. The choice of officers to fill the specialized positions on these staffs has not been a simple matter. The officers at present being appointed are being chosen for their ability and without any reference to their home origin. In this way it is hoped that Australian Army Medical Corps officers will realize that they are part of an all-Australian corps and not members of State units. All tendency to parochialism must be overcome if the Australian Army Medical Corps is to be a really effective instrument in the service of the Commonwealth. For this reason we welcome the information that a casualty clearing station being formed in Tasmania has a commanding officer from New South Wales, that a Western Australian field ambulance is commanded by a Victorian, and a South Australian hospital by a Queenslander.

Arrangements have been made for the establishment of hospitals in Australia. Approval has been obtained and plans have been made for the following hospitals: Brisbane, 200 beds; Sydney, 1,000 beds (eventually 1,600); Melbourne, 1,000 beds (eventually 1,500); Adelaide, 150 beds; Perth, 200 beds; Darwin, 120 beds (in addition to wards in the new civil hospital); Port Moresby, 50 beds. In the Hobart Hospital 200 beds are staffed by Army personnel. All these beds will, with few exceptions, be available for overseas casualties. In addition, many hundreds of beds have been provided in hospitals of high class in military camps throughout Australia, as well as hundreds of a more temporary type. Valuable help has been given by civil hospitals in some States, and it is anticipated that with the completion of the proposed undertakings future calls on civil hospitals will be small unless the international situation undergoes material change.

Particular interest centres round the question of medical equipment. After the examination of the tenders of many firms, equipment costing many hundreds of thousands of pounds has been purchased for overseas and home units. The scale of equipment has been drastically revised, and as a result equipment has become simpler and more modern, and it has been possible to exercise economy in instruments resembling one another. New appliances for army use, such as a gas anæsthetic machine, oxygen masks, surgical exhaust pumps and emergency blood transfusion outfits, have been evolved. A standardized blood transfusion outfit has been designed; its essence is a pannier

containing "Soluvac" bottles, with a simple "giving" and "taking" apparatus. Very promising investigations have been carried out on the preparation of serum and plasma, dry and liquid, for the use of overseas troops, and some liquid plasma has been sent to the Middle East. An improvised and transportable X-ray apparatus for hospitals and casualty clearing stations has been evolved. A tissue for the prevention of adhesions in cerebral wounds, nerve or tendon sutures, made from amniotic membrane, and first described by Penfield, of Montreal, has been prepared at the Walter and Eliza Hall Institute with the financial help of the Royal Australasian College of Surgeons and the collaboration of the Women's Hospital, Melbourne. Quantities of this tissue have been sent overseas. After the receipt of reports from Queensland on the excellence of kangaroo tendon as a suture material, sample quantities were prepared at the Walter and Eliza Hall Institute and large scale production is being organized. Investigations have also been made into the dependability of catgut manufactured in Australia.

Important innovations have been made in regard to transport. A new and light motor ambulance has been designed; it is based on an Indian pattern and some hundreds have been produced. A mobile "blood bank" was designed; it consisted of four vehicles for transport of citrated blood or liquid or reconstituted plasma or serum, for production of ice and for the necessary sterilizers and autoclaves. One "blood bank" has been presented by the Australian Red Cross Society, and others are being constructed. A mobile dressing station was designed by one medical officer and presented by another. This vehicle allows of easy and rapid access to the equipment necessary in a dressing station; it carries water and has a tent attached; the tent is carried on the roof and can be quickly erected, the vehicle being used as a centre. A number of other mobile dressing stations have been donated and constructed, and more are being built. A mobile bacteriological laboratory has been designed and is under construction. A mobile operating theatre has been designed for use with advanced field units; it can be used in connexion with the operating tent of an established medical unit, or, when a tent carried on the roof is opened, can form its own operating tent. A notable feature of this unit is the folding instrument tables of small size which carry sterile instruments, basins and dressings in a canvas case; these can be made ready for use in a few seconds. The necessary funds for several of these units have been donated. It is also interesting to note that the Ordnance Department, with technical medical advice, has evolved portable delousing apparatus based on the newest British pattern, mobile baths, simplified and effective filtering water-carts, and portable disinfectors.

Among the other activities of the army medical organization indicating progress, mention must be made of the examination of recruits by micro-radiography, of the vastly extended dental services and of the many prophylactic measures that are undertaken for the preservation of health among the troops.

Readers of this journal are also familiar with two other agencies which, though not part of the army organization proper, are essential for the effective carrying out of the war programme from the medical point of view. These are the Central Committee for the Coordination of Medical

Services and the Medical Equipment Control Committee. Of the latter it may be said that there is perhaps no more vitally important part of the whole medical organization in Australia.

Major-General Downes, on being invited to send a message through this journal to the medical profession of Australia, has written as follows:

As head of the Army Medical Service I am deeply grateful for and appreciative of the wonderful response to the call for volunteers for service overseas and in Australia; this response has been particularly apparent from those who had most to sacrifice. I can only express my regret that there have been insufficient vacancies for so many eager to give their services. The war, however, appears likely to be a long one and no one can foresee its limits; there may be opportunities for all that are fit for the strain, or the boredom, of military service. Great Britain's Prime Minister and our own have told us in the plainest of words that sacrifices, as yet undreamt of in Australia, must be made before victory can be won. The medical profession does not expect to escape these sacrifices, nor will it. If some cannot offer for overseas service when more are needed, they can help in many ways at home. For instance, younger men can work harder as resident medical officers when their numbers are lessened; elder men who have retired from the honorary hospital staff can again come back to their hospitals to relieve a man who is wanted for military service. I would make a special plea to all those who are not called on to leave their practices, and that is to play the game to those that are, and resolve now that when they return to civil life they shall not suffer as regards their livelihood and the welfare of their families for their action in helping their country.

I am particularly thankful to those who have been ready to fall into whole-time home service duties; their work, though essential, is unspectacular, and while involving greater pecuniary sacrifices lacks the kudos and the future prestige attached to service in the Australian Imperial Force. The profession should realize, and even in a materialistic sense, the losses accruing to the medical officers of the Militia, nearly all of whom have volunteered for overseas service. Absent compulsorily in camp for months at a time as a result of their peace-time readiness to train to become army medical officers, the disastrous effect on their practices is readily understood, particularly when it is realized that the *locum tenens* allowance payable in peace-time has unhappily been cancelled at the present time.

Finally the Army Medical Directorate at Headquarters and in the States welcomes criticisms, especially if constructive. If you think anything is not being done that should be done or is being done wrongly, communicate, preferably in person, with the Deputy Director of Medical Services in each State or the Director-General of Medical Services at Army Headquarters. You may be helping.

The Australian Army Medical Corps is normally a voluntary organization of civilians; it is small and trained to an elementary standard. From such a nucleus it is charged with the care in unnatural conditions of a body of men larger than the population of all but four towns in Australia. Mistakes undoubtedly there have been and will be, but a full-hearted effort is being made to fulfill the trust this country reposes in the medical services of the Army—a belief that can only be gratified by the evolution of a thoroughly efficient medical service. Particularly is this effort directed to finding the right man for the right job, and all that this involves. As far as the Army Medical Directorate is concerned, I lay claim to having these objectives in the hands of the most efficient and able staff that any army medical director has ever had. All are there at considerable sacrifice, and the actual amount and continuity of their duties is, I can assure you, greater than all but few civil practitioners have ever experienced. This applies equally to the Deputy Directors in each State, all of whom have left their normal civil avocations, and to their staffs who, with little preparation, find themselves in seas of trouble. They require the moral and intellectual help of

the medical profession. Administration of a volunteer army medical service is beset with difficulties that those who have not experienced them would hardly credit. Your united moral support can be of immeasurable help in smoothing out these difficulties. I ask you for it, with the sole object of achieving the goal for which the Army Medical Service exists—an organization capable of supplying that standard of medical treatment worthy of the Australian soldier. Could there be a higher one?

The Royal Australian Air Force Medical Service.

The Royal Australian Air Force is essentially a technical service with a great diversity of trades, and its ultimate object is to put highly trained men and complex machines into the air for fighting and defensive purposes. Medical needs for such a service are accordingly many and varied. Outstanding in these is the care of the pilot and other members of the air crew. The study of the peculiar physiological, psychological and clinical problems of flying are of great importance and interest to an Air Force medical officer, and he enters what is fast becoming recognized as a medical specialty, namely, aviation medicine. This is reflected not only in the work of the medical officer in charge of flying units, but in the standards and extent of the entry examination of all combatant flying personnel.

The present work of the Royal Australian Air Force is twofold; it trains men in various categories for the Empire Air Scheme and maintains operational units for the defence of Australia wherever this may be necessary. Air Force establishments in consequence are widely scattered throughout the Commonwealth in diverse climates and with differing requirements. Most new establishments are for war-time only and provide a problem in the provision of adequate medical accommodation for both the staff and the regularly changing tide of trainees. Medical accommodation comprises three large units, of which at present there are three known as Royal Australian Air Force hospitals under the command of a medical officer, larger station sick quarters employing, like the hospitals, female nurses, and smaller station sick quarters. The establishment of the Royal Australian Air Force Nursing Service this year is a great advance and affords possibilities for medical and surgical work within the service. The service hospitals now being built will also provide accommodation for all three services.

The Medical Branch of the Royal Australian Air Force at present consists of full-time administrative and unit officers, part-time specialists and a reserve. At the beginning of the war there were only six permanent medical officers and a small specialist and reserve list and a few Citizen Force medical officers. The Royal Australian Air Force has been working to a steady programme of expansion and production of trained personnel, and, as has been stated officially from time to time, the general position is now well ahead of this programme. Expansion is to continue and thereafter the service will continue at this increased level as long as is necessary. The total number of full-time officers in the Medical Branch, including dental and pharmaceutical officers, will probably reach 350.

The numbers of the medical profession offering to join the service have so far been more than sufficient to meet requirements. Young medical officers with some hospital experience or knowledge of private practice are especially

wanted. Older men and those with specialist qualifications who are particularly fitted for part-time service or service within Australia have offered in much larger numbers than are required. Many of these have also indicated their willingness for whole-time service, but have regretfully been declined on the grounds that their present work is of more value to the community as they are teachers at hospitals, occupy key positions *et cetera*.

At present there are in the Royal Australian Air Force Medical Service some 140 full-time medical officers—30 part-time consultants and a reserve, some of whom are employed on local part-time duty, and others are available for call-up to the active list if and when required. All full-time medical officers of the Royal Australian Air Force who are medically fit are liable for service either within Australia or overseas. The number of medical officers at present serving overseas is not large, and this has been somewhat of a discouragement to prospective applicants, particularly to younger men who desire overseas active service. Every endeavour, however, will be made to give the opportunity for overseas service to suitable medical graduates. While the immediate opportunities may be few, it is impossible to say what the demands of this conflict will entail in the movements and activities of medical officers. It is estimated that about another hundred full-time medical officers will be required for the Royal Australian Air Force in the course of the next two years.

Air-Commodore Hurley, in response to an invitation to send a message for publication, writes:

Great financial sacrifices have been made by many of the medical men on whole-time duty in the services, and an especial appeal is made to those others in the profession who are carrying on with private practice to see that the interests of their colleagues on service are safeguarded. In most States organizations and funds have been set up to do this, and it is the duty of everyone to support these to the fullest possible extent.

The Royal Australian Air Force Reserve is now open to all those practitioners who may be selected with a view to employment, whether whole or part-time, and appointments to the reserve may be made before such duty is imminent. Medical men interested are invited to communicate with the Director of Medical Services, Air Force Headquarters, Melbourne.

Conclusion.

The appeal to members of the medical profession to be mindful at all times of the welfare of their absent colleagues cannot be made too often. It is easy to be full of good intentions about such an endeavour; it is easier in the stress of a busy life and perhaps in the face of the importunities of patients lacking in understanding to forget the absent one. The appeal made by the heads of the services in this regard must be looked on as an appeal coming through them from absent colleagues themselves. In these circumstances we venture to hope that it will be heeded. The profession has in more than one direction during the last twelve months shown its desire through its official organization, the British Medical Association, to order its goings and comings in such a way that the best possible use may be made of its members in the present emergency. What doctors do in their collective organizations they will surely carry into their individual relationships one with another.

Special Articles on Psychiatry in General Practice.

(Contributed by request.)

XXVI.

OCCUPATIONAL THERAPY.

ALTHOUGH the abnormal reactions of almost all patients in the first two years of their psychosis are generally of such a kind as to make them unacceptable members of the social body to which they belong, these abnormal reactions are nevertheless much less numerous than their remaining normal reactions. It is essential in the treatment of these patients constantly to stimulate and develop those responses which remain normal. Once a psychosis has been established, treatment may be directed towards two aspects of the psyche. On the one hand, endeavours may be made to attack and destroy those purely individual reactions which really constitute the psychosis—and it is problematical what value is to be attached to direct psychotherapy when once a psychosis has definitely developed. On the other hand, we seek to stimulate or initiate reactions which may be termed social and which include all the remaining responses of the patient that may be regarded as normal.

It is towards this so-called socialization of the patient that occupational therapy is directed. Manual occupations probably constitute the strongest of all possible bonds with reality, and assist in strengthening those bonds that are gradually or speedily breaking; we therefore aim at substituting what is ordered, planned, objective and productive for the chaotic, formless, subjective or destructive products of the psychosis.

Although attempts to place occupational therapy on a scientific basis are relatively recent, the value of this form of therapy had long been known to those whose lives were spent among people with disordered minds. The annual report of the Gartnavel Asylum for 1816, for instance, makes mention of an old dragoon who every three months had been subject to an attack of "outrageous insanity", but who "became very happy knitting worsted gloves until a proper place of residence could be found for him".

The absence of proper facilities for occupational therapy apart from mental hospitals probably provides one reason for the frequently rapid improvement which follows the patient's removal to a hospital, either after certification or voluntarily. If the patient remains at home, he is in the same environment and the same circumstances that brought about the psychosis; if he is in a small hospital or nursing home he remains idle, frequently indulging in ever-increasing wish-fulfilling fantasy or wrapped in harmful introspection, a prey to self-depreciation. It has been found also in those hospitals in which large fees are paid by relatives that it is most difficult to persuade the patients to recognize occupation as a form of treatment.

To avoid the retreat from reality and the flight into fantasy that come with idleness, the patient's day should be carefully planned, in such a way that adequate periods are given to work, to recreation and to rest, and so that his interests are stimulated and his attention is diverted from himself. This planning must be individual, and though it is desirable that the patient should work in a group and should identify himself with that group, care must be taken that his individual desires are met and that any object of aversion is avoided.

It is desirable, though probably not essential, that the patients should work together. The mild competition that always occurs in a group, the interest that is awakened in the patient by his watching the creation of articles by the others and by their progress to mental health, the elation that is experienced after increasingly difficult tasks have been completed before a sympathetic audience, and the absence of that destructive criticism and consequent humiliation that have so often been the lot of the psychotic in the months of inadequacy before the disease became apparent, are all factors which assist in restoring to the patient some measure of self-esteem, of self-confidence and of self-reliance.

In the absence of planned occupation the patient's day is often given up to idleness, with periods of reading, writing and "going to the pictures"; all these are recreations frequently associated with derisive thinking, wherein the patient fulfils his ambitions and solves his problems in fantasy and day-dreams. In the planning of the patient's occupation it is always necessary to avoid monotony and to achieve continuous stimulation of interests. Frequently this stimulation

is better attained by an endeavour to complete some new task, to conquer some fresh difficulty, than by the patient's continuing at some task at which he has already achieved a satisfactory degree of skill. The occupational therapist must always be on his guard against any commercializing of this form of therapy, and he must always recollect that the skilful performance of a task or the production of an excellently made article is merely a means to an end.

As a general rule it is desirable to avoid those crafts which involve only that knowledge and those abilities used by the patient in his ordinary trade. One would not usually expect to achieve success by endeavouring to interest a skilled carpenter in simple joinery. Work is not suitable generally if it is of a routine nature, and so enables the patient to carry out his task whilst engaged in a long train of harmful introspection.

The actual period in the course of a psychosis at which occupational therapy should be begun must vary with the individual case; but it is preferable to err on the side of optimism and to endeavour to begin as early as seems practicable. In the two great groups of psychotics, those with manic-depressive reactions and those with schizophrenic reactions, occupational therapy should be begun as soon as the patient can be nursed out of bed. For the young schizoid patient, introverted, introspective, with feelings of inadequacy, yet attaining the summit of his soaring ambitions by ever-increasing fantasy, it is essential to plan and carry out a programme of occupation and recreation that leaves little scope for solitary dereistic thinking. The interest and mental effort necessary in the attainment of satisfactory skill in a craft and the self-confidence engendered by such attainment are definite factors in accelerating recovery.

In addition to its influence in the socialization of the patient who is actually psychotic, there is much greater scope for occupational therapy in the field of preventive medicine than is at present realized. It is essential that in all physical illnesses, but especially in those chronic illnesses productive of long-continued periods of inability to engage in one's ordinary mode of earning a livelihood (tuberculosis, nephritis, failing heart and the like), some occupation should be adopted that will help to maintain the patient's hopefulness and faith in himself. It must be remembered that there is an important psychological aspect to every physical illness, and neglect of this aspect must react unfavourably on the patient.

Of course it will frequently be necessary completely to reorientate the patient's ideas of values, until the previously husky, athletic "he-man", now crippled by a badly damaged heart, finds himself able to exhibit with pride a gaudy piece of Bulgarian work or some dainty piece of pen-painting. In such cases it is necessary to obtain the close cooperation of the other members of the household, in order to avoid any suspicion of criticism or discouragement, and to aid in maintaining the patient's healthy interest in his prowess at his craft.

As in the realm of physical disease the surgeon deems satisfactory the condition of the patient who has had a sarcoma of the femur, and who, after amputation of the limb, lives on at a much lower level of physical activity, so in psychiatry it is often one's lot to restore a patient to a level of mental activity much lower than before the active psychosis began. It is frequently necessary to be content with the result of one's labours when a patient, though still confined to hospital, is active, industrious and contented, is able to mix socially with fellows, enjoys all recreations, earns the cost of his maintenance, and has reactions which are 90% normal. Occupational therapy here finds probably its greatest scope—in retarding that dementia, often more apparent than real, which so often follows an acute psychotic episode involving detention in a hospital and, only too frequently, absence from all stimuli of interest.

Of all forms of occupational therapy, probably the most readily accepted by the majority of male patients is work in a flower or vegetable garden. Gardening appears to be regarded as the prototype of a masculine hobby, and patients adapt themselves to it readily. It needs a minimum of skill to obtain a satisfactory creative result, whilst the necessary destructive aspects (pulling up weeds, burning rubbish, destroying pests *et cetera*) provide some sublimation of the sadistic trends of the manic-depressive.

Other forms of occupation adopted for this method of treatment are mainly sedentary. Basket making, boot repairing, chair making, cane work, raffia work, silk work, weaving, wood carving—all these provide for a variety of tastes and involve a range of dexterity and adaptability which gives occupation to the dullest as to the more artistic and intelligent. It is most desirable, though it is not yet a common practice, that the more delicate and artistic forms of occupation should be provided for male

patients as well as for female patients; it should be remembered that all masterpieces of every form of art have been the product of the masculine hand and brain.

In addition to his occupation the patient's recreation must be planned. Here, however, one must be even more careful to consult the patient's individual taste, as nothing can be a greater source of annoyance than participation in a sport or game which holds no interest for an individual, whilst for the "rabbit" the humiliation of constant failure speedily increases his feelings of inadequacy and inferiority.

It would appear that the application of occupational therapy is difficult in the case of the frankly psychotic except in a mental hospital. Even in these hospitals this form of therapy is scarcely out of swaddling clothes; but it is applied by therapists who are trained mental nurses and who have built a knowledge of occupational therapy upon practical experience and long association with psychotic patients. Early admission to hospital is therefore advisable in all cases when a psychosis becomes apparent—voluntarily if possible. For many neurotics and psychoneurotics also admission to hospital is preferable, as it frees the patients from many of the circumstances and influences that led to the final development of the disease, and removes them from an environment that is usually harmful.

Mere removal of the psychotic or psychoneurotic from these noxious influences is rarely sufficient *per se* to lead to recovery. Frequent advice given to those able to afford it is: "Take a sea trip." To the jaded business man or to the woman worn out by family cares or the demands of the social world (patients suffering merely from prolonged fatigue), the enforced idleness, both physical and mental, that one finds on a liner is everything that is beneficial. Only too often the business man has spent previous holidays in a strenuous pursuit of pleasure, or the housewife has exchanged the ordered routine of her home for the bustle and discomfort of a seaside cottage or the discomforts and anxieties of a motor-car tour.

Unfortunately such benefit from a voyage cannot be expected for the psychotic. Bad sailors as many are, they find the physical depression and mental stress of sea-sickness merely added burdens to carry. In the narrow confines of shipboard society any unusual form of behaviour, any peculiar idea expressed, is speedily magnified, and the patient becomes the conscious object of merciless and critical interest for his fellow passengers. The long hours of enforced idleness become hours of introspection, of self-analysis and of desperate need to hide from his fellows, with resulting increasing withdrawal from reality and flight into fantasy for the schizoid, and for the depressive additional feelings of inefficiency, unworthiness and futility. Only too frequently the return of the psychotic from a voyage has been speedily followed by a successful attempt at suicide.

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British Medical Association News.

SCIENTIFIC.

A MEETING of the South Australian Branch of the British Medical Association was held on August 29, 1940, at the Institute of Medical and Veterinary Science, Adelaide.

Menorrhagia and Metrorrhagia.

DR. R. F. MATTERS read a paper entitled "Menorrhagia and Metrorrhagia" (see page 688).

DR. W. F. JOYNT thanked Dr. Matters for his interesting paper. He then referred to functional hæmorrhage, which he defined as irregular or excessive uterine bleeding without gross physical signs. It was well established that under the action of the gonadotropic hormones certain changes took place in the ovaries during each menstrual cycle, and according to these changes the endometrium passed through various stages, each of which had a definite histological picture. Dr. Joynt then briefly described the stages. They were: (i) the resting stage; (ii) the proliferative stage, in which the endometrial changes were controlled by oestrin from the Graafian follicle; and (iii) the secretory stage. The Graafian follicle ruptured between the fourteenth and twelfth premenstrual days; after the rupture the corpus luteum was formed. The action of the luteal hormone on the endometrium produced the secretory phase. Dr. Joynt said that the changes could be recognized by a histological examination of the endometrium during the various phases. For example, if a biopsy specimen of the endometrium was taken on the second premenstrual day and normal secretory

endometrium was found, then it was known that ovulation had occurred and that the gonadotropic hormones elaborated by the pituitary had produced a normal follicle. If, however, in such a biopsy specimen no evidence of the normal secretory stage or persistence of the proliferative stage was found, then it could be said that ovulation had not occurred and no *corpus luteum* had been formed. Dr. Joynt pointed out that this was a simple clinical method giving definite information for future treatment. It had recently been proved that excessive or irregular bleeding could occur from any type of endometrium. Menstruation was essentially a vascular phenomenon, and any defect in the contractility of the myometrium could cause excessive bleeding.

Dr. Joynt then referred to non-operative treatment. He spoke first of the treatment of bleeding from an endometrium showing evidence of absence of the normal secretory phase. There were three methods of treatment; the first was the administration of *corpus luteum*, with which he had had little success. The second was the administration of gonadotropic hormone obtained from the serum of pregnant mares; intra-muscular injections of 40 units were given each day, and Dr. Joynt thought the method useful. The third method was irradiation with minimal doses of X rays; Dr. Joynt said that he had seen good results, but the method seemed too dangerous. The second and third methods were successful when rupture of the Graafian follicle took place and a normal luteal phase followed. Dr. Joynt then discussed bleeding from an endometrium showing decidua-like changes due to an excess of *corpus luteum* hormone; this type was associated with polymenorrhoea. There were two methods of treatment: (i) massive doses of oestrin, for example, five milligrammes of "Stilbestrol" twice a day; (ii) the administration of testosterone propionate. Testosterone propionate acted in two ways: it had an inhibitory action on the gonadotropic hormone of the pituitary, and it diminished the flow of blood to the uterus and the volume of blood in the myometrium. The dosage was 25 milligrammes given intra-muscularly, the dose to be repeated at intervals of two days. The follow-up treatment consisted of curettage and examination of a biopsy specimen. If normal secretory endometrium was found, five milligrammes of testosterone propionate should be given for six days before the commencement of the menstrual period; but if endometrium in the proliferative phase was found, 15 milligrammes should be given twice a week for two weeks and five milligrammes twice a week for one week.

A MEETING of the New South Wales Branch of the British Medical Association was held on September 19, 1940, at Sydney Hospital. The meeting took the form of a number of clinical demonstrations by members of the honorary staff of the hospital.

Rheumatic Heart Disease.

Dr. G. C. WILLCOCKS showed a male patient, aged twenty-nine years, who had been admitted to hospital on July 16, 1940. The patient had had an attack of rheumatic fever sixteen years earlier. Since then he had noticed breathlessness on exertion. Five weeks prior to his admission to hospital his legs began to swell. He had an attack of hæmoptysis fourteen months earlier. While he was in hospital, on August 26, 1940, the patient had a sudden attack of pain in the chest and he became very breathless; this occurred five days after he was allowed out of bed to sit in a wheel chair, and coincided with the onset of auricular fibrillation.

The patient had a mitral flush, but was not breathless at the time of the meeting. The pulse was irregular and its rate was 60 per minute. The systolic blood pressure was 120 and the diastolic pressure 70 millimetres of mercury. The left border of the heart was in the seventh intercostal space, five and a half inches from the mid-line. A thrill was palpable at the mitral area, systolic in time, and systolic and diastolic murmurs were present at the mitral area and at the aortic area; the second sound was accentuated at the pulmonary area. Some dullness and crepitations were noted at the bases of both lungs. No oedema of the legs was present. When the urine was examined at the time of the patient's admission to hospital the specific gravity was 1,030, and it contained a large amount of albumin. At the time of the meeting the specific gravity was 1,020, and the urine contained no albumin. An electrocardiogram on July 22, 1940, revealed right ventricular preponderance, and another on September 16, 1940, revealed right ventricular preponderance and auricular fibrillation. An X-ray examination of the heart on July 29, 1940, revealed a greatly enlarged heart shadow, but its outline did not suggest a precordial effusion. Congestive changes

were present in the lung fields. Dr. Willcocks said that the heart was very large and rheumatic, with aortic and mitral incompetence and auricular fibrillation, which came on in hospital. An Austin Flint murmur was present at the mitral area, and a very faint diastolic murmur was present higher up to the left of the sternum.

An Unusual Neurological Condition.

Dr. Willcocks also showed a male patient, a plumber, aged forty-one years, who had had gradually increasing weakness of the hands for six weeks, and severe cramps in the legs. He first noticed that he could not sign his name properly. As he was a plumber, he was sent for examination to the Department of Public Health. The Department of Industrial Hygiene reported the results of a blood count made on August 20, 1940: the erythrocytes numbered 5,350,000 per cubic millimetre and the hæmoglobin value was 70%; there were 7,000 basophile cells per million. At Sydney Hospital on August 31, 1940, another blood count gave the following results: the erythrocytes numbered 5,100,000 and the leucocytes 9,400 per cubic millimetre; no stippled cells were seen.

Examination revealed cerebellar ataxia of the hands, especially the left, and extremely brisk reflexes, equally so on both sides. Interesting conditions were: (a) the gradual onset of loss of function in the hands, which was due to cerebellar ataxia and not to muscular weakness; (b) cerebellar ataxia and dysidiadochokinesis, more pronounced in the left arm; (c) extremely brisk reflexes in arms, legs and abdomen; (d) cramps in the legs; (e) attacks of giddiness and tinnitus, associated with increasing deafness of twelve years' duration.

Dr. Willcocks remarked that the nervous lesion affected the cerebellar and probably the pyramidal tracts in the pons; this could be due to neoplasm or to disseminated sclerosis. Other causes, such as syphilis, had been excluded. The patient was suspected of plumbism; but he had worked less with lead during the last twelve months than ever in his life before, and he had never before been suspected of plumbism. The apparent weakness of the hands was not due to a lower motor neurone palsy. The amount of lead in the urine was only 0.01 milligramme per litre. There was no diminution in the hæmoglobin value or the number of erythrocytes. The giddiness was probably due to labyrinthine vertigo and not to the nervous lesion. Dr. Willcocks thought that the patient was suffering from cerebellar ataxia, probably due to disseminated sclerosis, but possibly to neoplasm.

Neoplasm of the Lung.

Dr. Willcocks finally showed a Chinese patient, aged sixty-four years, who had been admitted to hospital on May 31, 1940. He had had a cough with sputum for twenty years. Six weeks earlier he noticed a sudden pain in the chest which was worse on coughing; he had lost much weight lately. He was breathless on exertion, but had no swelling of the legs. His breath was foul and his sputum was copious, yellow and foul. The chest moved evenly; the percussion note was dull in the left interscapular region. On auscultation the breath sounds were vesicular and diminished in intensity in the lower lobe of the left lung. Crepitant râles in the lower lobe of the left lung were present on inspiration and expiration. No abnormality was detected in the central nervous system or the abdomen.

An X-ray examination on September 1, 1940, revealed some central consolidation on the left side extending upwards towards the axilla, possibly a neoplasm or tuberculosis. On September 11, 1940, an X-ray examination was made after the instillation of Ipiodol. The appearances suggested a multiple abscess in the middle zone of the left lung. There was a small doubtful area at the apex of the left lung and the middle zone of the right lung field. No tubercle bacilli were detected in the urine. The Wassermann test produced a complete positive reaction. A blood count on September 1, 1940, revealed 4,210,000 erythrocytes and 14,350 leucocytes per cubic millimetre; 62% of the leucocytes were neutrophilic cells; the colour index was 1.11. The sedimentation rate was 124 millimetres in one hour. Dr. Willcocks said that the diagnosis rested between tuberculosis and neoplasm of the lung, the latter being more probable.

Aplastic Anæmia.

Dr. E. H. STOKES's first patient was a man, aged forty-eight years, by occupation an engineer; he had been shown previously at a meeting of the Section of Medicine held on July 11, 1940. According to the history obtained, he first became ill in January, 1940, when he suffered from fatigue and palpitation on exertion and loss of energy. Petechiæ were present on the lower limbs. A blood count on January 4 gave the following results: the erythrocytes

numbered 2,000,000 per cubic millimetre and the hæmoglobin value was 35% (4.8 grammes *per centum*); the leucocytes numbered 1,500 per cubic millimetre, 22% being neutrophile cells, 75% lymphocytes and 3% monocytes. No platelets were seen on the films.

The patient was admitted to Sydney Hospital on April 3, 1940. On examination it was noted that he was extremely pale. The pulse was regular, but the rate was more rapid than normal (96 per minute). A soft mitral systolic murmur was present. The systolic blood pressure was 140 and the diastolic pressure 86 millimetres of mercury. The spleen was not palpable. A barium meal examination revealed gastric and duodenal irritability, a barium enema revealed no abnormality, and a fractional test meal examination revealed complete achlorhydria. The Van den Bergh test produced a direct negative result. The report after sternal puncture on April 5, 1940, was as follows: "Marrow mixed with blood; not suggesting leucæmia, but rather a marrow which is becoming aplastic—the number of immature cells, red and white, is few."

Dr. Stokes said that during his stay in hospital the patient had been treated by means of repeated blood transfusions, and by the administration of "Anahæmin", "Redoxon", "Fersolate" tablets and "Marmite". The lowest number of erythrocytes was found on June 11, when 500,000 erythrocytes per cubic millimetre were present.

In July petechiæ reappeared on the lower limbs, and it was found that the bleeding time was prolonged. A daily reticulocyte count in July showed no response. During the month prior to the meeting the patient's general condition had improved. Intramuscular injections of six cubic centimetres of liver extract (Parke, Davis and Company) had been given every second day during the past fourteen days. The latest count, on September 16, gave the following results. The erythrocytes numbered 2,210,000 per cubic millimetre, the hæmoglobin value was 45% (6.2 grammes *per centum*), the colour index was 1.02 and the leucocytes numbered 2,150 per cubic millimetre. The white cells were mostly mature. The differential leucocyte count showed that 16% were neutrophile cells, 0.5% were basophile cells, 79% were lymphocytes, 1.5% were monocytes, and 3% were band forms. A slight degree of macrocytosis and microcytosis was present.

Dr. Stokes remarked that this patient appeared to be suffering from the primary form of aplastic anaemia, the production of erythrocytes, leucocytes and platelets being all affected by the aplasia.

Syringomyelia.

Dr. Stokes's second patient was a woman, aged twenty-five years, who was considered to be suffering from syringomyelia. About six months prior to the date of the meeting she had noticed weakness of her right hand.

On examination it was seen that the thenar and hypotenar eminences were wasted; hypertension at the metacarpophalangeal joints and flexion at the interphalangeal joints produced the "claw hand" appearance. Sensation to light touch over the hand and forearm was normal, but analgesia to painful and thermal stimuli was present. The blood serum failed to react to the Wassermann test, and X-ray examination of the cervical region revealed the absence of a cervical rib. She had been treated by means of "Viteolin", two capsules being taken three times a day before meals during the past month.

Extradural Hæmatoma.

DR. GEORGE BELL showed a male patient, aged fourteen years, who had been admitted to hospital on June 30, 1940, and discharged on August 10, 1940. The boy had been hit by a tram at 9 p.m. on June 30, 1940. He lost consciousness at the time of the accident and remained unconscious for three-quarters of an hour. He was stuporose when seen in the casualty department. At 9.45 p.m. on his admission to hospital he was pale, drowsy and very cold; his respirations were shallow; the pulse rate was 120 per minute, and the pulse was very feeble. The pupils were equal and reacted to light, the knee jerks and ankle jerks were exaggerated, and the plantar reflexes were flexor in type. There was a hæmatoma in the right temporal region.

On July 1, 1940, at 3 p.m., the patient had been comatose at intervals and had vomited five times. The right plantar reflex was extensor in type and the left was doubtfully extensor. The left arm was flaccid and the right arm was spastic. The pupils were equal and reacted to light, and there was external deviation of the left eye. The patient was comatose. On July 1, 1940, at 10 p.m., the right pupil was inactive and larger than the left, which reacted slowly to light. The left plantar reflex was flexor in type and the right extensor. The corneal reflexes were present. Both arms resisted movement. The pulse rate had fallen to 70

per minute and the pulse was full and bounding. Incontinence of urine was present. The right eye was more prominent than the left. There were occasional Jacksonian fits, starting in the left hand. On July 1, 1940, at 11 p.m., operation was performed. "Pentothal sodium" given intravenously was the anæsthetic agent. The exposure was made through an incision in the temporal region similar to that used for subtemporal decompression (Cushing), and the following injuries were found: a linear fracture of the skull, rupture of the right middle meningeal artery in at least three places, and an extradural clot compressing the brain. The middle meningeal artery was ligated. After operation both pupils were small and equal and reacted to light.

From July 2, 1940, to July 6, 1940, the patient was conscious and rational. A drainage tube was inserted at the time of operation and removed at 7 p.m. on July 2, 1940. "Proseptasine" (12.5 grammes) was given during convalescence. On August 10, 1940, the patient was discharged from hospital and referred to the psychiatric clinic for observation.

Probable Cerebral Contusion.

Dr. Bell then showed a male patient, aged thirteen years, who had been admitted to hospital on July 20, 1940. He had bumped his head when playing football three days previously and was said to have bumped his head on a tree branch at approximately 3 p.m. on the day of his admission to hospital. He was not unconscious, only dazed. He arrived at the casualty department at 6 p.m., non-cooperative and very quiet. The left pupil was larger than the right, and both reacted sluggishly. The knee jerks, ankle jerks and plantar reflexes could not be elicited. The pulse rate was 120 per minute. At 8.5 p.m. the right side of the face began to twitch, then the right hand, and the patient had a right-sided clonic fit. The fits became more and more frequent and were continuous by 9 p.m. He did not regain consciousness between fits. The pulse rate was 160 per minute. The condition of the patient was rapidly deteriorating and it was decided to operate.

At 10 p.m. an incision was made in the temporal region, similar to that used for subtemporal decompression (Cushing). A small extradural hæmorrhage was found on the left side; there were no clots. The dura was opened; no subdural hæmorrhage was found. The brain was blue and oedematous. On the right side no extradural hæmorrhage was seen and the dura was not opened. Fifty cubic centimetres of 15% saline solution were given intravenously.

On July 21, 1940, the patient was very restless; his temperature was 103° F. and his pulse rate 160 per minute. The respirations numbered 56 per minute. Lumbar puncture produced clear fluid under a pressure of 250 millimetres of water. Fluid was given through a small stomach tube by the drip method, and at 9.15 p.m. the patient asked for a glass of water.

On August 3, 1940, he complained of aching in the right ear and had two more fits, beginning with twitching of the right eyelid and progressing to the muscles of the right side. After the fits the right arm and leg were found to be flaccid and weak. Two lumbar punctures were performed. The right external auditory meatus was examined and, though the appearance of the drum was not normal, it was not thought to be the cause of the fits. An enema of a 50% solution of magnesium sulphate was given with benefit to the patient.

On September 10, 1940, the gradual improvement had been maintained; the patient was discharged from hospital well, with no signs of paralysis. "M & B 693" was given during his convalescence.

Gunshot Wound.

DR. ARCHIE ASPINALL showed a male patient, aged eighteen years, who on August 29, 1940, was wounded in the lower portion of the right leg by a shotgun at a distance of one foot; he could not walk. He was taken to hospital and the wound was dressed. He was brought to Sydney on the following morning and taken to a private home after the leg had been examined radiologically; he felt ill all that day. On August 31, 1940, the following morning, he was seen by a doctor. He was given 1,500 units of tetanus antiserum and 4,000 units of gas gangrene antiserum, and was immediately admitted to hospital. He felt very ill and listless, but had not vomited. He was taken to the operating theatre.

The skin was shaved and cleansed with ether and iodine. A wide excision of the damaged skin was made, and foul-smelling, dark-coloured and some blackened muscle bellies of the anterior tibial group were excised in the lower third of the leg. Portion of the peronei in that region were also excised. The wound had a pungent smell suggestive of *Bacillus coli communis* or spirochætal infection. The wound

and the edges of the skin were packed with "Vaseline" gauze. The dorsum of the foot was much swollen, so numerous small incisions were made in the skin to relieve the tension. The wound was covered with pads and the leg was encased in a light plaster cast from above the knee to the toes. Cultures obtained from swabbings taken from the wound during operation were next day reported to be morphologically indistinguishable from *Bacillus welchii*.

On his return to the ward the patient was given a further 8,000 units of gas gangrene antiserum. His temperature rose to 103° F. that night. On the following morning the patient was given one gramme of "M & B 693" every four hours. His temperature fell that day, and for the next four days it was 100° F., although he was given "M & B 693" for one day only. The patient was pale, but his condition gradually improved; since then the improvement had been maintained and the temperature had been normal. On September 9, 1940, the plaster cast was removed as well as the covering pads. Pus was present in the wound; the tendons were exposed. The muscle tissue and skin edges were healthy. "Vaseline" gauze was placed round the skin edges, and fresh pads and a fresh plaster cast were applied.

Compound Fracture of the Left Tibia.

Dr. Aspinall also showed a male patient, aged twenty-seven years, who had been admitted to hospital on July 5, 1940. He had been involved in a motor bicycle accident, and was suffering from a compound fracture of the left tibia.

The leg was cleaned; *débridement* was performed under nitrous oxide and oxygen anaesthesia. The wound on the medial aspect of the middle of the tibia was incised downwards. Two lateral skin incisions were made to permit adequate closure of the wound; silkworm gut sutures were used. "Vaseline" gauze was packed in the wound, 1/80 carbolic dressings were applied, then some pads, and a plaster cast was put on from above the knee to the toes. An X-ray examination revealed reduction of the fracture, the fragments being in a good position; a further X-ray examination one month later showed good position and a small sequestrum.

On September 6, 1940, more than eight weeks after the accident, the plaster cast and dressings were removed. A little pus was found with some granulation tissue heaped up in the wounds. Bluestone was applied, and since then a plaster back slab for the leg was all that had been used. During the patient's stay in hospital his temperature had never risen above 99° F.

De Quervain's Disease.

Dr. S. L. SPENCER showed a female patient, aged ten years, who had fallen and hurt her right wrist in May, 1940. At the time an X-ray examination was made at another hospital, but revealed no bony injury. The patient was first seen in July and complained of pain in the wrist ever since the accident. Clinical examination revealed great tenderness localized to the radial styloid, while severe pain was experienced on ulnar adduction of the hand with the thumb held in the palm. Adduction of the hand with the thumb left free was painless. In view of the short history and the patient's age, conservative treatment was instituted, and consisted of immobilization in a plaster cast for a month. Temporary improvement followed, but the pain returned and was extending up the arm. It impaired the use of the hand in writing and lifting. Further X-ray examinations in July and September revealed no bony lesion.

Dr. Spencer recalled that although only about 200 cases of de Quervain's disease had been reported, it was believed that the condition was much less rare than previously thought. Most of the reported cases had occurred in adult or elderly females, and had followed chronic trauma or over-exercise, such as piano-playing or typewriting; but in a few instances the condition, as in the patient shown, had been ascribed to acute trauma. The disease was due to a stenosing tendo-vaginitis involving the fibrous sheath of the tendons of the *abductor pollicis longus* and the *extensor pollicis brevis*. Conservative treatment had usually proved disappointing, while surgical intervention, consisting of simple incision of the thickened fibrous sheath, had almost invariably been followed by immediate and lasting relief. Dr. Spencer thought that operation might eventually be found necessary in the case under discussion, and invited suggestions regarding treatment.

Dr. GEORGE BELL advised a further trial of conservative treatment.

Dr. LAURENCE MACDONALD considered that operative treatment should be undertaken and was alone likely to benefit the patient.

Procidentia with Trophic Ulceration of the Cervix Uteri.

Dr. HUBERT K. PORTER and Dr. STANLEY D. MEARES showed a woman, aged fifty-one years, who had had seven children and was suffering from procidentia. She complained that eighteen months earlier she had noticed a small swelling at the vulval orifice on straining. This had gradually become more and more pronounced until suddenly, four months prior to her admission to hospital, the swelling had become very much larger. Although it caused her some inconvenience when walking and she had some frequency of micturition during the day, she suffered no nocturnal frequency. On her admission to hospital two weeks previously she was found to have complete procidentia, which became evident as soon as she was on her feet. There was pronounced trophic ulceration of the cervix and the vaginal mucosa was thickened and dry from exposure to the air and from friction.

The patient was put to bed and a course of glycerine and ichthyl tampons was given. Improvement was more rapid than might have been expected, for the major portion of the ulcerated area had healed. It was thought that operation would be possible in another week. Good results could be expected from Fothergill's operation and posterior colpoperineorrhaphy.

Lymphopathia Venereum.

Dr. Porter and Dr. Meares then showed a married woman, aged sixty years, suffering from *lymphopathia venereum* or esthiomene. Although she had been married twice, she had had no children or pregnancies. Apart from a visit to Fiji, Suva, where she remained for nine months, she had lived all her life in New South Wales.

She had been admitted to hospital in July, 1939, complaining of swelling of the vulva of three months' duration, pain on defecation of four years' duration, and incontinence of urine of five years' duration. The swelling of the vulva was not accompanied by pain or irritation. She also complained of attacks of polyarthritides of short duration.

Examination revealed the typical thickening and leaden colour of the whole vulva and gluteal region, more particularly on the left side, with isolated scarring due to healed ulceration. Elephantiasis of the clitoris and vulva (more especially of the left *labium major*) was pronounced. The urethra showed evidence of extensive old ulceration, which was completely healed, and a large urethral caruncle.

The vaginal orifice and lower third of the vagina were the site of old scarring, causing stricture. The rectum was the site of an extensive cylindrical stricture extending for one and a half inches along the gut from half an inch inside the anus. The rectum would not admit the tip of the little finger. There was no palpable enlargement of the inguinal glands. Examination of a catheter specimen of urine revealed a few pus cells. A test meal examination showed that the patient suffered from complete achlorhydria. The Wassermann and Kahn tests produced no reactions. A blood count gave the following information: the erythrocytes numbered 3,630,000 per cubic millimetre, the haemoglobin value was 8.5 grammes *per centum*, and the colour index was 0.83; the leucocytes numbered 8,920 per cubic millimetre and 4% were eosinophile cells. The blood sedimentation rate, estimated by Westergren's method, was 138 millimetres in one hour (normal, six to ten millimetres). The Frei test gave a positive reaction. No microfilaria were found in specimens of blood collected at 10 a.m. and at 11 p.m. A piece of tissue was removed from the left *labium major* and the pathologist reported as follows: "Normal epithelium. Connective tissue densely fibrous and lymphocytes. Small area with epithelioid type of cell." No specific abnormality was found in one of the inguinal glands which was removed.

The cellulitis present was treated with applications of *Lotto Nigra*, and it cleared up rapidly. Diluted hydrochloric acid (one drachm three times a day) was given for the achlorhydria, and the patient benefited to a great degree. The stricture of the rectum was treated with graduated bougies and the condition improved a little; but she derived most benefit from continued doses of liquid paraffin by mouth. The elephantiasis of the clitoris and left *labium major* became more and more pronounced, until it caused discomfort on walking. Surgical measures were resorted to, and the overgrown tissue in the region of the clitoris was removed and the major portion of the left *labium* was excised. This made her much more comfortable. The operation was performed in January, 1940; but in the six weeks preceding the meeting both strictures had begun to become more pronounced again, and present indications were that they would again need further operative interference.

Pregnancy in a Bicornuate Uterus.

Dr. Porter and Dr. Meares's third patient had a four months' gestation in one horn of a bicornuate uterus. She

stated that she had not menstruated for eight weeks and thought she was pregnant. There had been no previous pregnancies. The patient was a normally developed woman, aged twenty-three years. There were no breast changes and no abdominal tumour.

The vulva was normal. The vagina was septate in its upper half; neither opening into the upper part of the vagina would admit a finger. The septum had a minimum thickness of half an inch. No uterus could be palpated bimanually in the mid-line. There was a firm irregularly fusiform tumour, four and a half inches in its longest axis, arising from the mid-line posteriorly in the pelvis and extending to the right upwards and forwards. It was mobile at its upper limit and rather fixed below. A combined vaginal and pelvic examination was necessary to delineate this tumour. No tumour could be felt on the left side of the pelvis. The diagnosis of an eight weeks' gestation in a bicornuate uterus was made.

Some weeks later, when the septum had softened, it was possible to insert a finger on either side. It was then found that the septum was incomplete superiorly, and that there was a small soft cervix on the right side and none on the left. Up to the time of the meeting the pregnancy had been uneventful, and at eighteen weeks the tumour differed from the normal only in being rather elongated and lying obliquely. An excretion pyelogram showed no renal agenesis. The uterus was considered to be either a *uterus bicornis bicollis* or a *uterus didelphys*, with a rudimentary left side. It was proposed to report the case more fully at a later date, when the uterine anomaly had been investigated after the puerperium.

Dr. Porter and Dr. Meares pointed out that most patients who had such uterine malformations led a perfectly normal existence. Most of the malformations had been first noted during pregnancy, and many of the patients had had previous normal pregnancies, during which the abnormality was not detected. If the pregnant horn was not rudimentary there was great probability that the course of events would be quite natural. Maldevelopment of the birth canal, such as the presence of a vaginal septum, a double cervix or a bicornuate uterus, was not an absolute indication for Caesarean section. The patient should be permitted to have a test of labour.

Urological Specimens.

DR. ROBINALD BRIDGE presented several series of specimens. The first series illustrated various types of prostatic obstruction. Two specimens showed the fully developed three-lobed type of hypertrophy; another specimen showed two large lateral lobes. The three patients were aged sixty-eight, seventy-six and seventy-seven years, and had the usual history of prostatism. The third specimen was a post-mortem specimen showing a greatly hypertrophied bladder and a prostatic bar.

The second series of specimens were of kidney carcinoma removed from men aged fifty-three, sixty-four and seventy-two years. Symptomless haematuria was the outstanding feature in the history of the first two. Dr. Bridge said that the third specimen was one of the largest he had ever seen. There had been no urinary symptoms; the patient complained of the tumour and of the weight in his abdomen. The patient, aged seventy-two years, had made an uninterrupted recovery from what was, for a man of that age, a formidable operation. The anterior abdominal approach had been used. A T-shaped incision, one side down the lateral side of the rectus and the other at right angles towards the left loin, had been made down to and including the peritoneum. An incision into the posterior part of the peritoneum lateral to the descending colon made possible the medial retraction of this section of the bowel. In this way vessels in the renal pedicle could be ligated and divided under vision. Dr. Bridge doubted the practicability of the usual lumbar approach for a kidney of this size.

A specimen in Dr. Bridge's nephrolithiasis series was from a woman, aged fifty-one years. A stone occupied the whole of the renal pelvis. The patient had had years of alkali treatment for a gastric ulcer, and the renal stone had been detected during an X-ray examination for the gastric ulcer.

Urological Procedures.

DR. KEITH KIRKLAND demonstrated the modern type of instruments used in transurethral resection in cases of prostatic obstruction. He pointed out that he favoured the Stern-McCarthy instrument, but frequently to complete the operation he used a one-handed modification as introduced by Nesbit, of Ann Arbor. This instrument, which worked on the trigger principle, allowed the index finger of the left hand to be inserted into the rectum to lift the prostate. This obviously resulted in a more complete removal of

tissue than was possible with the Thompson or Stern-McCarthy units.

Dr. Kirkland also demonstrated the O'Connor sheath, which, after being sterilized, was fixed in position in the patient's rectum and avoided contamination of the lifting finger. Dr. Kirkland said that he was of the opinion that transurethral resection as an operation had come to stay; but he decried the unscientific enthusiasm of many advocates of the procedure, who regarded the method as satisfactory in every type of case. He also pointed out that the operation was much more difficult than suprapubic prostatectomy, and considerable training was necessary before the correct assessment of the bladder neck obstruction could be made; that was essential before the operation could be undertaken speedily and efficiently. Dr. Kirkland also showed and discussed the Cumming nephrostomy tube, which drained and splinted the ureter and renal pelvis when any plastic procedure to the ureter or pelvis was undertaken for hydronephrosis. Lantern slides from a case in which the Schyzer operation had been carried out and the tube had been used, revealed a diminution in the size of the pelvis, with corresponding improvement in the calyces and the drainage system generally.

In a short discussion on the technique of uretero-intestinal anastomosis, Dr. Kirkland said that he favoured the extraperitoneal operation, which removed all risk of peritonitis and actually could be performed more quickly and with much less shock.

Ulceration of the Glans Penis.

DR. ARCHIBALD TELFER showed two patients who had had ulceration of the *glans penis*. He said that in the past many surgeons had called similar lesions Paget's disease. The term Paget's disease of the penis applied only to naked-eye appearances, and microscopically had no relation to the condition found in Paget's disease of the breast. Similar superficial lesions of the *glans penis* had been previously listed as Bowen's precancerous dermatosis, Savatard's psoriasiform carcinoma, Queyrat's *erythroplasia*, and Paget's disease of the penis. Dr. Telfer's two patients had, respectively, early carcinoma and chronic inflammation of the *glans penis*. The diagnoses had been made on the microscopic appearances of biopsy specimens.

The patient suffering from carcinoma of the *glans penis* was aged sixty-three years, and had noted the ulceration for two years before seeking advice. The ulcer, when examined seventeen months previously, was about 1.5 centimetres in diameter. A photograph taken at that time showed a carcinomatous ulcer with raised edges on the ventral surface of the glans. Dr. Sylvia Bray, the radium registrar, had applied radium in a wax mould, using 1.5 millimetres of platinum equivalent filtration at a total distance of 0.8 centimetre. The dosage at the centre of the surface lesion was 4,600 r and at the edge 4,200 r. The treatment was given for fifty hours over a period of eight days. The patient showed no sign of the lesion or of enlarged inguinal glands.

The second patient illustrated the result of a dirty long prepulse and underlying chronic inflammation and ulceration of the *glans penis*. The lesion was first examined at the hospital seventeen months previously. Attention to cleanliness had lessened the area of superficial ulceration. Dr. Telfer said that without biopsy it was very difficult to label this type of lesion accurately, and that much confusion had arisen because a diagnosis was often made on the macroscopic and not the microscopic appearances.

A MEETING of the Victorian Branch of the British Medical Association was held on September 10, 1940, at Saint Vincent's Hospital. The meeting took the form of a number of clinical demonstrations by members of the honorary staff of the hospital.

Bronchial Carcinoma.

DR. F. J. COLAHAN and DR. R. HADLEY showed a male patient, aged forty-seven years, whose health had declined twelve months earlier. He had had a cough with a little expectoration for twelve months; seven months prior to the meeting he had noticed that the sputum was blood-stained for three days. Dyspnoea on exertion was present, and he had some loss of weight.

On examination he was found to have a temperature of 99° F. and a pulse rate of 92 per minute; the respirations numbered 20 per minute. Clubbing of the fingers and toes was present. Dulness to percussion, diminished breath sounds with râles and diminished vocal resonance were noted at the base of the right lung. The Wassermann test failed to produce a reaction. The haemoglobin value was

33%. No abnormality was detected in an electrocardiogram. An X-ray examination revealed infiltration at the lower lobe of the right lung and later a fluid level. A bronchoscopic examination revealed some rough slightly projecting tissue at the junction of the right lower and middle lobe bronchi. A piece was taken for examination; biopsy revealed infiltrating carcinoma. Treatment was by postural drainage and artificial pneumothorax, preliminary to exploration of the chest.

Abscess of the Lung.

Dr. Colahan and Dr. Hadley next showed a female patient, aged forty-three years, who had had teeth extracted under general anaesthesia five weeks earlier. One week afterwards she suffered from sharp pain in the chest, dyspnoea and shivers. Expectoration of copious foul sputum began two weeks prior to the meeting.

On examination the patient was found to have a temperature of 102° F. and a pulse rate of 100 per minute; the respirations numbered 24 per minute. The percussion note was dull, and diminished breath sounds and crackling râles were noted all over the right side of the chest, especially at the base of the right lung. Postural drainage caused expectoration to cease, the temperature and pulse rate dropped to normal in ten days, and the chest signs disappeared.

Several investigations were undertaken. The haemoglobin value was found to be 80%; the leucocytes numbered 10,500 per cubic millimetre. No tubercle bacilli were found in the sputum. The Casoni test produced no reaction. On August 14, 1940, an X-ray examination revealed an abscess cavity in the upper part of the lower lobe of the right lung; a basal shadow was noted, which might have been due to the presence of fluid, or else to the diaphragm. By August 28, 1940, clearing of the lung field was taking place. On September 19 instillation of lipiodol revealed good filling of most bronchi; the anterior basic bronchi were slightly compressed.

Carcinoma of the Stomach following Gastro-Jejunostomy.

Dr. Colahan and Dr. Hadley's next patient was a male, aged seventy years, who twenty-five years earlier had had perforation of a peptic ulcer, followed by three operations. Four years prior to the meeting he had undergone gastro-enterostomy for the relief of pain and melena of ten months' duration. During the following four years he was fairly well until six weeks prior to the meeting, when vomiting began; at times it occurred one hour after meals, and at other times it occurred only once in two days, when the vomitus consisted of undigested food. He had also suffered from constipation and had lost three stone in weight in two months.

On examination a rounded small mass was found under the left costal margin. The haemoglobin value was 90%. The benzidine test applied to the faeces produced a strongly positive result. Analysis of the gastric contents revealed an absence of free hydrochloric acid; a considerable amount of mucus was present. Examination after a barium meal revealed a small stomach hitched high up; emptying through the stoma was delayed.

At operation dense adhesions were found everywhere. A hard mass was felt in the stomach in the region of the stoma, and glands were palpable. A piece was taken for section, and microscopic examination revealed nodules of carcinoma.

Calculus Hydronephrosis.

Dr. Hadley and Dr. Colahan next showed a female patient, aged thirty-seven years, who had pain in the left loin for as long as she could remember. She also suffered from nocturnal frequency of micturition and attacks of dysuria.

On examination the left kidney was found to be enlarged and tender. Masses of erythrocytes and pus cells were found in the urine. A plain X-ray examination revealed a large oval shadow with two smaller shadows above the iliac crest on the left. A retrograde pyelographic examination revealed pronounced distension and irregularity of the left kidney.

The operation of nephrectomy was performed on the left side by the anterior extraperitoneal approach. The patient had very little post-operative discomfort. The lesion was found to be a large hydronephrosis with a calculus in the lower pole.

Calcification about the Knee Joint.

The next patient shown by Dr. Colahan and Dr. Hadley was a female, aged fifty-four years, who forty years earlier had sustained a burn on the leg. The scar on the leg had been breaking down recently; bone was exposed and there was a slight discharge.

On examination the scar of a burn was found about the knee. There was a shallow ulcer with surrounding inflammation, and a sequestrum was found in the base of the ulcer. An X-ray examination revealed a large irregular area of calcification on the postero-lateral aspect of the knee joint, overlapping the fibular head, but distinct from the joint as shown in the lateral films.

Pedicle Graft to the Heel.

Dr. Hadley and Dr. Colahan finally showed a male patient, aged sixteen years, whose foot had been crushed by a train on June 11, 1940. Primary excision was undertaken on the same day. A Thiersch graft to the dorsum of the foot was made on July 30. A pedicle graft was made to the heel from the opposite heel, and the limb was encased in plaster of Paris on August 23.

Hydatid Cyst of the Liver.

Dr. FRANK NIALI and Dr. Colahan then discussed the history of a female patient, aged seventy-two years, who had had a cold nine weeks prior to her admission to hospital. Six weeks later she suffered from pain in the right shoulder, shifting to the right axilla, worse on coughing. She also had shivers, breathlessness and cough.

On examination she was found to have a pleural effusion on the right side. A large rounded mass was present, attached to the right lobe of the liver. The patient's systolic blood pressure was 210 and her diastolic pressure 100 millimetres of mercury. Her temperature was 100° F. Fluid was aspirated from the chest, and culture yielded a growth of *Bacillus coli communis*.

On July 9, 1940, intercostal drainage under negative pressure was instituted. The patient's condition improved, but later oedema appeared in the sacrum and ankles. On August 10, 1940, hydatid membrane was found blocking the tube. On August 22 auricular fibrillation was observed. On August 28 bile-stained hydatid membrane was removed, and on September 6 an operation for rib resection and drainage was undertaken under local anaesthesia; the patient died a few hours after operation. Investigations undertaken earlier had disclosed the following findings. On July 16 the Casoni test produced a negative result (a one-inch flare), the sputum was examined with negative results, and there was no response to the hydatid complement fixation test. On July 9 the blood urea level was 32 milligrammes per 100 cubic centimetres, and an X-ray examination revealed a pleural effusion.

A post-mortem examination was made. The right lung was adherent in the lower two-thirds, and recent adhesions were present. These adhesions were easily separable until the base of the right lung was reached. Between the lower lobe, which was normal except for collapse, and the costophrenic angle, there was a cavity lined with thick fibrous tissue; its internal surface was inflamed and covered with altered blood. A large hydatid cyst was present, involving the lateral third of the lobe of the liver; it communicated with the pleural cavity through a very small sinus. No cause could be found for the patient's sudden death.

Tabes Dorsalis with Primary Optic Atrophy.

Dr. P. DOWLING showed a male patient, aged fifty-six years, who had been referred to the hospital on account of an eye condition; his sight had been growing worse for three years. He had also been losing weight for three years. For some months he had had difficulty in walking; he dragged his legs and had numbness in the feet. For fifteen years he had had sharp intermittent pain in his legs, mainly in the left knee; it came on in attacks. He had incontinence of urine by day and night; he could micturate voluntarily if he wished. At the age of eighteen years he had had a chancre, which was treated by a pharmacist.

On examination no abnormality was detected in the heart, lungs and abdomen. The systolic blood pressure was 150 and the diastolic pressure 90 millimetres of mercury. The pupils were large and irregular; they did not react to light, but did react to accommodation. There was no perception of light in the left eye; vision in the right eye was $\frac{6}{60}$. The visual field of the right eye was confined to the nasal quadrant. There was slight impairment of the eighth right cranial nerve, and tremor of the tongue was present. Examination of the reflexes gave the following information: the arm reflexes were sluggish, the knee and ankle jerks were absent, and the plantar reflexes were flexor in type. Analgesia was present on the nose and ulnar borders of the forearm; cotton-wool sensation was lost over the chest below the second dorsal segment. Vibration sense was poor up to the iliac crests; deep sensation was almost absent. Some unsteadiness was noticed in the performance of the

finger-nose test; coordination in the legs was poor (heel to knee) and ataxia of gait was most pronounced. Bilateral primary optic atrophy was present; the disks were greyish-white with sharp edges and very slight cupping.

Treatment consisted of the administration of *Haustus Hydrargyri Iodidi*, and of the injection of two cubic centimetres of "Bismol" twice a week. Arsenical injections were to be given later, but it was not hoped that they would have any beneficial effect on the already severe visual loss.

Bronchiectasis.

Dr. Dowling also showed a male patient, aged thirty-five years, who had been admitted to hospital on November 29, 1939, with left basal pneumonia of three days' duration. He was given "M & B 693" and the pneumonia resolved rapidly. The patient was discharged to a convalescent hospital on December 13; but he developed a cough with increasing amounts of yellowish sputum, and he had signs suggesting cavitation at the base of the left lung. He was returned to Saint Vincent's Hospital, and on January 2 postural drainage was instituted; the period of drainage was increased up to twelve hours daily in the next two weeks. At that time he was producing about six ounces of greenish sputum. An X-ray examination after the institution of lipiodol on January 4 revealed sacculated bronchiectasis of the lower lobe of the left lung.

For the past six months the patient had been at home, continuing with postural drainage. He still had about four ounces of sputum a day, which he found difficult to expel even with the help of postural drainage. He had a slight degree of clubbing of the fingers, and stated that in the last three months he had lost one stone in weight. In the lower portion of the left side of the chest movement was diminished, the percussion note was impaired, and breath sounds were absent or bronchial breathing was noticed. Some râles and creaking sounds were audible in that area. An X-ray examination on June 15 showed that a considerable area of consolidation was still present at the base of the left lung.

Dr. Dowling said that he proposed to perform lobectomy, as the condition was progressive; it was producing general toxæmia, evidenced by the clubbing of the fingers and loss of weight. There was also the risk of further bronchopneumonic attacks or metastatic complications, such as cerebral abscess. Bronchoscopic aspiration might be helpful as a preliminary measure. The bronchiectasis revealed by the X-ray examination of January, 1940, appeared well developed, and was probably of long standing. The patient had no history of long-continued chest conditions prior to the pneumonia that began in November, 1939. He had had typhoid fever at the age of nine years, and influenza in the epidemic of 1919; since then he had had a slight cough with occasional sputum. It was thought that he might have developed a dry bronchiectasis, possibly from an atelectatic portion of the base of the left lung.

Types of Heart Disease.

Dr. T. A. F. HEALE showed several patients illustrating types of heart disease. The first was a female, aged thirty-six years, who had first attended the hospital on October 18, 1939. In June, 1939, she had contracted a respiratory infection and was in bed for two weeks. Since then she had complained of "funny turns", in which she felt a peculiar choking sensation in the throat. These attacks were of a few seconds' duration, and occurred once or twice a week. Prior to June, 1939, she had felt perfectly well.

On examination, apart from obesity, the only abnormalities detected were in the heart. The apex beat was in the fifth left intercostal space, four and three-quarter inches from the mid-sternal line. The rhythm was regular. A thrill, not confined to systole, was felt in the second left intercostal space. A long whirling murmur, both systolic and diastolic, was heard in the same area. An X-ray examination of the chest revealed enlargement of the heart and prominence of the pulmonary arc. The systolic blood pressure was 140 and the diastolic pressure 70 millimetres of mercury.

A diagnosis of congenital heart disease, patent *ductus arteriosus* and enlargement of the heart was made. The exact nature of the "funny turns" was not determined, though the description rather suggested the occurrence of premature beats. None, however, had been heard on numerous examinations.

Treatment had consisted of the reassurance of the patient that the "turns" were not of a serious nature and the prescription of a reducing diet, which had resulted in the loss of one and a half stone in weight. At the time of the meeting the patient felt very well and was working as a boot machinist. Dr. Heale pointed out that the danger of that type of heart disease was the development of

bacterial endocarditis. Whether or not that would occur, and if it did, when, were alike unpredictable. An optimistic outlook was justifiable.

Dr. Heale then showed two patients with mitral stenosis. The first, a woman, aged thirty-three years, first attended the hospital on September 19, 1938, complaining of stabbing pain under the left breast, fatigue and shortness of breath on exertion. All these symptoms varied greatly in severity from day to day, and some days she felt extremely well. Her weight had been increasing over the last three years, and was now eleven stone one pound, almost two stone above her previous usual weight. She had also had much domestic worry over a period of several months. She had known for many years that her heart was not normal, and stated that she had had rheumatic fever at the age of twelve years and chorea one year later. She had one child, born in 1936; pregnancy and labour had been without complications. Apart from obesity, the only abnormal findings were in the heart. The apex beat was in the fifth left intercostal space, three and a half inches from the mid-sternal line. There was a presystolic thrill at the apex, and presystolic and diastolic murmurs were present. The rhythm was regular and there was no evidence of congestive heart failure. With alleviation of the domestic anxieties and a reduction of weight this patient was at the time of the meeting very well and able to do her ordinary work without discomfort.

The second patient, a female, aged fifty years, had attended the hospital on September 15, 1938, complaining of a "cold in the head" and sore throat of one week's duration. She had had rheumatic fever at the age of twenty years and was in bed for several months. Three years prior to the meeting she had undergone hysterectomy because of excessive menstrual bleeding; she had required a blood transfusion before operation. Convalescence from the operation had been uneventful. She had one son, born when she was thirty-one years of age. Pregnancy and labour had been uneventful. Apart from naso-pharyngitis, the only abnormal findings were in the heart. The apex beat was in the fifth left intercostal space, three and a half inches from the mid-sternal line. There was a presystolic murmur at the apex, heard only when the patient was lying down. There was no diastolic murmur. The rhythm was regular. There were no signs of congestive heart failure. The systolic blood pressure was 130 and the diastolic pressure 80 millimetres of mercury. The patient had remained well and able to do her ordinary household work without discomfort.

Dr. Heale said that these two patients represented stages in the evolution of chronic rheumatic heart disease. Both were of interest, in that they had had successful pregnancy without any ill effects, and the second had undergone a major operation recently without any upset. Both had regular rhythm and as yet showed no signs of cardiac failure. As a contrast, Dr. Heale said that he had hoped to show another patient, aged twenty-three years, who had just gone through an acute attack of rheumatic fever; but she had had a recurrence of joint symptoms and fever within the last two days. This patient was interesting in that she had just developed acute rheumatic polyarthritis; it had subsided only to be followed by acute carditis and pericarditis, and about two weeks later by extensive pleurisy, first on the left side and then on the right. She survived all this and had been very well and afebrile for five weeks until the recurrence of arthritis two days prior to the meeting. There was an aortic regurgitant murmur in the heart, which had developed during this illness; so far as was known, it was the patient's first attack of rheumatic fever.

Dr. Heale then showed a female patient, aged fifty-three years, who had attended the hospital in November, 1937, complaining of a "cold in the head" and an irritating cough of one week's duration; she also complained of increasing dyspnoea on exertion for the past three months. Apart from diphtheria at the age of twenty-six years, she had had no illnesses. She had no family.

On examination in 1937 she was found to have naso-pharyngitis and also evidence of cardiac disease. The apex beat was in the sixth left intercostal space, one inch outside the mid-clavicular line. Auricular fibrillation was present. The heart rate was 124 per minute. No murmurs were heard. There were signs of congestive heart failure—engorged veins in the neck, crepitations at the bases of the lungs, slight enlargement of the liver and some oedema of the lower limbs. There was no thyroid enlargement or obvious sign of thyrotoxicosis. Under treatment her condition improved greatly, the signs of congestive failure disappeared and the heart rate was well controlled with two grains of powdered digitalis leaf daily. An X-ray film was suggestive of mitral valve involvement.

During the past two years enlargement of the thyroid gland and definite signs of thyrotoxicosis had developed. There had been no recurrence of the congestive heart failure

and the heart rate was still well controlled on the same dose of digitalis. The patient declined operation on her thyroid.

Dr. Heale said he regarded her as suffering from thyrotoxic heart disease, though at first he thought the condition might be rheumatic heart disease with mitral stenosis, the presystolic murmur having disappeared with the onset of the auricular fibrillation. The easy control of the heart rate with digitalis was interesting in the presence of thyrotoxicosis. The recovery from congestive heart failure and its non-recurrence were also interesting.

Dr. Heale's last patient, a female, aged sixty-nine years, was referred to the out-patient medical clinic in June, 1939, after her recovery from a fractured neck of the left femur, which had been treated with the Smith-Petersen nail. She had known that she had high blood pressure for the past seven years, but had no symptoms apart from an occasional occipital headache.

On examination the apex beat was found to be in the fifth left intercostal space, four inches from the mid-sternal line; the impulse was forcible in character. The rhythm was regular. A systolic murmur was heard all over the precordium, with maximum intensity at the aortic area. There were no signs of congestive heart failure. The systolic blood pressure was 240 and the diastolic pressure 140 millimetres of mercury. The brachial and radial arteries were thickened and the retinal vessels showed arteriosclerotic changes. The urine did not contain albumin or sugar. In December, 1939, the patient developed complete heart block, which had persisted. She had been more short-winded since then, and on several occasions had had slight oedema of the legs and crepitations in the lungs; rest in bed for ten to fourteen days relieved the congestive failure, and if she took life easily she was able to carry on without much discomfort. She had never had any Stokes-Adams attacks, and it seemed likely that her heart block was consequent to a small coronary occlusion, which would also account for the decreased exercise tolerance.

Cerebro-Spinal Meningitis Treated by Sulphapyridine.

Dr. JOHN HAYDEN showed a male patient, aged twenty-five years, who had been suffering from cerebro-spinal meningitis and who had been cured by intensive sulphapyridine therapy. The patient was admitted to hospital on the sixth day of his illness, unconscious and incontinent of urine; pronounced neck stiffness and spinal flexion, an external rectus palsy, and a bluish mottling of the skin due to peripheral vascular failure were present. The cerebro-spinal fluid contained 28,000 leucocytes per cubic millimetre, and numerous Gram-negative diplococci were present. Meningococci were obtained on culture. Sulphapyridine therapy was instituted by the administration of five grammes of the drug by catheter passed nasally into the stomach. One and a half grammes were given every four hours for forty-eight hours; on the third and fourth days six grammes were given, and on the fifth and sixth days three grammes. In forty hours after the commencement of treatment the patient was conscious, the leucocytes in the cerebro-spinal fluid had been reduced to 5,000 per cubic millimetre, very few organisms could be seen, and attempts at culture yielded no growth. On the seventh day the leucocytes in the cerebro-spinal fluid were 50 per cubic millimetre, and no organisms could be seen; the signs of meningeal irritation had completely disappeared, but the external rectus palsy remained. Serum was not used. Dr. Hayden said that he felt that without sulphapyridine the patient would probably have died, and certainly would not have made so rapid and dramatic a recovery. In England cerebro-spinal meningitis had been very prevalent in 1940, and in the first three months of the year 5,000 cases had been reported. The mortality rate in one series of 120 had been reduced to 7%, owing to sulphapyridine therapy. The dose recommended by Banks was nine grammes on the first and second days, six grammes on the third and fourth days, and three grammes on the fifth and sixth days. The only additional treatment required was lumbar puncture for the relief of headache, and that should be carried out only once in each twenty-four hours.

Sulphapyridine in *Brucella Abortus* Infection.

Dr. Hayden also reported the unsuccessful use of sulphapyridine in *Brucella abortus* infection. A boy, aged fourteen years, complained of sore throat and headache; he was found to have an evening temperature of 103° F., a leucocytosis of 4,000 per cubic millimetre, and a palpable spleen. His blood serum agglutinated *Brucella abortus*. After a high fever had continued for nine days sulphapyridine was given in doses of six grammes a day for forty-eight hours, and then three grammes a day were given. After three days the temperature became normal; but the spleen was still palpable and the pulse rate was 100 per minute. Despite

further treatment these findings remained, and three weeks later the fever recurred and persisted for three weeks despite the administration of sulphapyridine. The temperature then became normal and the spleen could no longer be felt; but the pulse rate was still in the region of 100 beats per minute and it was possible that there might be further recurrences of fever.

Dr. Hayden pointed out that the literature was very confusing as to the value of sulphapyridine in *Brucella abortus* infection; but in general it could be said that the claim that the drug exerted a beneficial effect on the course of the disease were not well substantiated. Dr. Hayden said that in this case the drug had had no influence on the course of the disease.

Diffuse Peripheral Neuritis following the Administration of Sulphapyridine.

Dr. Hayden finally reported an instance of diffuse peripheral neuritis occurring as a result of the use of sulphapyridine in the treatment of a patient suffering from pneumonia. The signs of neuritis occurred after four days of sulphapyridine therapy, which caused a rapid drop in temperature and improvement in the general condition of the patient. After eight weeks the neuritis had cleared. Dr. Hayden said that this complication was a rare result of sulphapyridine therapy.

Radiological Exhibits.

Dr. LEO KING showed a number of X-ray films. The first films dealt with three cases of prolapsed intervertebral disks, demonstrated by the injection of three or four cubic centimetres of lipiodol into the spinal theca. In none of these cases was any abnormality to be detected on the plain films. In each case a clearly marked semi-circular indentation was found at the level of the prolapsed disk, and on one side only, when the patient was in the ventral decubitus. All cases were verified at operation, which effected cure of all symptoms.

Films were shown from a case in which calculous hydro-nephrosis associated with cholelithiasis was demonstrated during the course of a barium enema examination, which was being conducted on account of diarrhoea. The hydro-nephrotic kidney caused indentation of the colon of an atypical nature.

The next films were from a case in which collapse of the middle lobe of the lung had occurred associated with pronounced narrowing and irregularity of the middle lobe bronchus near its origin, due to a bronchial carcinoma.

Films were shown to demonstrate the use of the upright position during the taking of cholecystogram films as a routine procedure. It was pointed out that the greatest density of the gall-bladder dye in a well-outlined organ with the patient in the erect position was at its inferior part, and that as the specific gravity of a dye-filled gall-bladder was greatest where the shadow was most dense, gall-stones having a low specific gravity (for example, cholesterol stones) floated. In the particular case under discussion the small cholesterol calculi could not possibly have been demonstrated had the patient been examined lying down. A further film was shown in which larger cholesterol calculi were present, floating in the middle third of a well-outlined gall-bladder.

Subdural Abscess; Osteomyelitis of the Skull.

Dr. F. P. MORGAN showed a male patient, aged twenty-eight years, who had arrived at hospital exhibiting Jacksonian seizures of the right side of the face and tongue and of the right upper limb, followed by paralysis of these structures and motor aphasia. One month previously he had been struck on the head with an ax. The laceration thus caused was almost but not quite healed; from the still open portion a little pus escaped. The surrounding area of the scalp was tender. The patient's temperature was 102° F., his pulse rate was 96 and his respirations numbered 80 per minute. An X-ray examination revealed a circumscribed area of osteomyelitis beneath the wound. The cerebro-spinal fluid was under a pressure of 85 millimetres of water; the fluid was clear and it contained 140 leucocytes per cubic millimetre.

At operation a small circular opening, 1.5 centimetres in diameter, was made in the bone over the speech area. A fine incision, two millimetres in length, was made in the dura, and immediately well-formed yellowish pus escaped. Gram-positive bacilli, streptococci, erythrocytes and polymorphonuclear leucocytes were found in a smear of the pus. The wound was immediately closed and attention was directed to the removal of the diseased bone, which lay close to the mid-line in the left posterior frontal region; the area of bone was about the size of a crown piece.

After operation the patient was given "M & B 693"; 48 half-gramme tablets were given in twenty-four hours. No other special treatment was required. Three weeks after operation aphasia and paralysis had almost disappeared.

Occipital Cystic Astrocytoma.

Dr. Morgan next showed a male patient, aged twenty-one years, who had presented himself at the hospital with symptoms of failing vision, amblyopic attacks and headache, of one month's duration. Examination revealed bilateral papilledema of more than eight diopters, hemianopia of the right lower quadrant and slight bulging of the occipital bone between theinion and the bregma. No word blindness was present.

An X-ray examination revealed thinning and protrusion of the bone between theinion and the lambda, displacement of the longitudinal sinus to the right side of the mid-line, and areas of fine calcification close to the mid-line, near the *fals cerebri*.

At operation a left-sided occipital osteoplastic craniotomy revealed an enormous cystic and solid tumour occupying all the occipital lobe above the level of the calcarine fissure and the posterior half of the parietal lobe above the plane referred to. The tumour was removed except for a few small fragments forward in the parietal lobe. Microscopic section showed the growth to be an astrocytoma. Two months after the operation the papilledema had completely subsided and visual acuity was unimpaired; but the lower quadrantic hemianopia remained.

Dr. Morgan then showed a male patient, aged nineteen years, who had come to the clinic suffering from headache and vomiting of twelve months' duration. He exhibited papilledema, right homonymous hemianopia and hypertension; the systolic blood pressure was 170 and the diastolic pressure 100 millimetres of mercury. The provisional diagnosis was essential hypertension. An X-ray examination revealed a large mass of calcification in the left occipital pole just above and to the left side of theinion. While waiting in hospital for operation the patient developed ataxia and word blindness. Operation by a left occipital craniotomy disclosed a large cystic and solid tumour of the occipital lobe. The cyst was evacuated and the solid tumour was removed. After operation the headache immediately disappeared and the papilledema subsided in the course of six weeks; the hemianopia still persisted eleven months after operation. The blood pressure had fallen to 120 millimetres of mercury systolic and 80 millimetres diastolic. The word blindness had gradually lessened, so that at the time of the meeting it was only a lengthy and strange word that bothered the patient.

Traumatic Arterio-Venous Aneurysm of the Carotid in the Cavernous Sinus.

Dr. Morgan's next patient was a female, aged fifty-four years, whose left eyeball began to protrude three weeks after a head injury which was attended by unconsciousness, laceration of the scalp and a linear fracture of the left occipital bone. For one week the eye continued to protrude, during which time severe headache, diplopia and lachrymation of the left eye were remarked. Thereafter the left eyeball began to recede, but not completely. The patient was conscious of a whirring noise in the head.

Examination three months later revealed pulsating exophthalmos of the left eyeball of moderate degree, congestion of the left conjunctival membrane, relative cutaneous analgesia and anaesthesia of the ophthalmic division of the fifth nerve on the left side, and a continuous murmur with systolic accentuation over the left side of the forehead. The maximum intensity of the murmur was at the left superorbital margin. Compression of the left common carotid artery obliterated the murmur. The patient was being treated by compression of the common carotid artery for one hour every day.

Dislocation of Nucleus Pulposus.

The next patient shown by Dr. Morgan was a married woman, aged thirty-six years. She gave a history of pain in the lower part of the back, the left buttock and the back of the left thigh. The pain, which had been present for three years, had increased in severity during the twelve months before the patient's admission to hospital. The pain was never entirely absent, but was greatly increased by standing or walking. Rest by lying on the right side relieved the pain. The pain was sufficiently severe to prevent the patient from working. No history of spinal injury was obtained.

Examination revealed slight wasting of the left calf, thigh and buttock, slight weakness of plantar flexion of the left ankle, diminished ankle jerk on the left side, the presence of Lasègue's sign on the left side, limitation of flexion of the lumbar portion of the spine, and a tender spot over the upper portion of the ala of the sacrum on the left side. A lipiodol examination of the spine revealed a filling defect on the left side between the fifth lumbar and first sacral bodies. This defect was seen in the ventral decubitus, but

not in the dorsal decubitus. The radiographs were shown by Dr. L. King.

At operation a herniated *nucleus pulposus* was removed, over which the fifth left lumbar root was stretched. The effect of the operation was immediately to abolish the pain in the back, buttock, thigh and leg, and to fit the patient again to follow her work.

Dr. Morgan next showed a male patient, aged forty-one years, who had suffered from lumbago ten years earlier. For the last eighteen months he had suffered from pain in the lower part of the spine, the right buttock, the back of the right thigh and in the right leg to the ankle, but not in the foot. There was no history of spinal injury. No relief was obtained by manipulation, spinal support or injection of the sciatic nerve. The patient was much crippled by the pain.

Examination revealed tenderness over the fifth left spinous process, slight wasting of the right buttock, with loss of tone but no wasting of the muscles of the calf of the right leg, fibrillation of the calf muscles on both sides, and moderate weakness of plantar flexion of the right foot. Lasègue's sign was present on the right side. The right ankle jerk was diminished. Slight relative cutaneous analgesia and anaesthesia were present over the sacral areas of the buttocks, also on the outer aspect of the right lower limb; there was slight lumbar scoliosis, with convexity to the left. Examination of the spinal subarachnoid space after the injection of three cubic centimetres of lipiodol revealed a filling defect on the right side between the fifth lumbar and the first sacral vertebrae.

At operation a herniated *nucleus pulposus* lying anterior to and pressing on the right fifth lumbar root was removed. The pain immediately disappeared when the patient got up from bed; in four weeks he was able to walk quite well, and in two months he had resumed his work.

Calcified Astrocytoma of the Left Cerebellar Lobe.

The next patient shown by Dr. Morgan was a female, aged seventeen years, who complained of headache and vomiting of one month's duration. Examination revealed papilledema of both eyes to about one diopter, and slight paresis of the external rectus muscle on both sides. There was no nystagmus. Bilateral hypotonia was present, slightly more on the left side than on the right. A slight degree of ataxia was noted in the finger-nose test on the left side. Lumbar puncture revealed fluid under a pressure of 400 millimetres of water. An X-ray examination revealed small irregular areas of calcification in the posterior fossa on the left side.

Operation disclosed a large solid tumour, proved on section to be an astrocytoma, occupying the left cerebellar lobe and vermis. The tumour extended so as to press on the floor of the fourth ventricle without invading it. After the removal of the tumour the patient showed signs of damage to the posterior longitudinal bundle and to the left facial nucleus or the infranuclear fibres. The grossly disordered condition of the conjugate eye movements and the facial paralysis cleared in a matter of two months, a residual palsy of the left external rectus muscle being left. Dr. Morgan said that there had been no recurrence of the symptoms since the operation was performed two and a half years earlier.

Nerve Section for Ménière's Disease.

Dr. Morgan then showed a female patient, aged thirty-three years, who had had for six years attacks of vertigo associated with vomiting and staggering gait. The duration of the attacks was from two to six hours, and they occurred at intervals of six months. The intervals between them were then reduced to eight weeks, and when the patient came to hospital they occurred as frequently as every second day. Diminution of hearing on the left side had been present for three years and tinnitus of the left ear for two years. The patient was frightened of traffic. The function of the left labyrinth was diminished. The patient could hear whispers at a distance of three inches on the left side and six feet on the right.

At operation the vestibular portion of the left eighth cranial nerve was divided. As a result of the operation the attacks of vertigo had been much diminished; only two attacks had occurred in three months. The operation had had no effect on the tinnitus. Up to the time of the meeting the patient had not ventured out by herself. The hearing of the left ear was not affected by the operation.

Dr. Morgan's next patient was a male, aged forty-one years, who had been growing increasingly deaf in the right ear over a period of fifteen years. During the preceding four months he had noticed increasing deafness in the left ear. At intervals during the preceding twenty years he had suffered attacks in which he lost his balance, and when he

walked he staggered towards the left. During the three months prior to the meeting terrific headache had developed. Examination revealed headache, diplopia and deafness of the right ear of nerve type. The patient was able to distinguish sounds, but not to differentiate words. The deafness of the left ear was of middle-ear type. He could hear a soft voice at a distance of one inch on the left side; both labyrinths were inactive.

Complete division of the eighth cranial nerve on the right side abolished the tinnitus and the headache, which constituted the patient's most serious complaints. As a result of the cessation of the tinnitus, the hearing of the left ear was much better.

(To be continued.)

A MEETING of the Queensland Branch of the British Medical Association was held on October 4, 1940, at Brisbane, Dr. J. G. WAGNER, the President, in the chair.

Chloroform Anæsthesia.

DR. C. A. THIELANDER read a paper entitled "Chloroform Anæsthesia: A Report on 3,000 Cases" (see page 683).

DR. S. F. McDONALD reported his experiences with chloroform anæsthesia, first of all under the late Dr. Hamilton Russell, and later during the Great War of 1914-1918, when chloroform was found to be very useful.

DR. C. J. WEEDON commented on the irregular position in the obstetric use of chloroform. In Brisbane the matron of nearly every obstetric hospital, unless specially forbidden, had the patient under chloroform anæsthesia before the arrival of the *accoucheur*.

DR. W. L. FOTHERGILL corroborated Dr. Weedon's statement, and said that in country practice he had discouraged the habit.

DR. J. G. WAGNER, from the chair, conveyed the thanks of the meeting to the lecturer.

Correspondence.

THE RADIOLOGICAL DIAGNOSIS OF TUBERCULOSIS.

SIR: The letter by Dr. J. G. Edwards in your issue of December 7 is misleading and it cannot be allowed to pass unchallenged.

No radiologist or physician of any standing would ever suggest that the clinical aspect of a case including sputum and other tests should not be considered in conjunction with X rays in the diagnosis and treatment of pulmonary tuberculosis. However, it is incorrect to state that a radiologist cannot give an opinion as regards the activity of a lesion. In a few cases this may not be possible, but in by far the greater number of cases a radiologist can definitely estimate whether the lesion is active, and if he has not the knowledge and experience to do so, he is failing in his duty to the patient and the clinician.

Surely in frankly exudative lesions or in the presence of cavitation the lesion must be considered as active; or, on the other hand, would not calcification and fibrosis suggest that the lesion was tending to heal? Further films will then disclose whether the lesion is regressive or progressive. Again, it has never been suggested that the 35-millimetre film is as good as the 17 x 14, but when properly taken it is quite satisfactory for diagnosis. If the 35-millimetre film is not satisfactory, it is only due to faulty technique, just as many larger films are unsatisfactory. At any rate, very early tuberculous lesions can be diagnosed on the small film and the question of activity can be decided in most cases almost as well as on the larger film.

One gains the impression from Dr. Edwards's letter that 35-millimetre film examination of chests is unsatisfactory. In view of the very large number of cases satisfactorily examined for the military *et cetera*, I feel that this was not intended.

Yours, etc.,

B. P. ANDERSON STUART.

135, Macquarie Street,
Sydney,
December 11, 1940.

Books Received.

"Biological Aspects of Infectious Disease", by F. M. Burnet, M.D.; 1940. Cambridge: The University Press; Melbourne: G. Jacoor. Demy 8vo, pp. 318, with illustrations. Price: 15s. net.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Wiles, Marjorie Booth, M.B., B.S., 1939 (Univ. Sydney), 4, Blaxland Road, Bellevue Hill.

Barry, Michael, M.B., B.S., 1939 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.

Sibree, Eric Wilberforce, M.B., B.S., 1936 (Univ. Sydney), c/o J. G. Sibree, Esq., 141, Young Street, Neutral Bay.

Byrnes, Francis Charters, M.B., B.S., 1939 (Univ. Sydney), Strafford Street, Manilla.

THE undermentioned has applied for election as a member of the Western Australian Branch of the British Medical Association:

Stoller, Alan, M.R.C.S. (England), L.R.C.P. (London), 1935, Mental Hospital, Claremont.

Diary for the Month.

JAN. 6.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmalm United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 173, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

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